IRON AGE

editorial

Investigation Blues

THE seen and unseen forces which make people believe you can get something for nothing got a big shot in the arm during the past month. The slender thread of cooperation between management and labor has been put to a terrific test. The line of demarcation between these two groups has been hardened.

Why is this so? It follows recent lessons in "How to get security the easy way." The RFC hearings in Washington were a three-ring circus to some. To others they were a down-to-earth lesson on how to get to the top with a little knowledge of the law and a lot of friends.

There was no case of out and out criminality. A lot of it was what we call "getting by." Millions of people who aren't built that way were struck with stark proof that what they heard and did not want to believe was true—some with the right friends can get what they want without too much labor or sweat.

Then came the Kefauver Senate Crime Committee hearings. They proved what a lot of people suspected but never gave much thought—a definite tieup between politics and crooks. This too was a shock to millions of people who never met a politician or a crook.

Such disclosures should call for a housecleaning on a national and local scale in and out of government. But what a lot of people think after seeing or reading about the RFC and Kefauver shows leads to something that may be demoralizing.

The hearings showed that many have been able to get counterfeit security either by finding loopholes in the laws or by thumbing their noses at them. It takes an expert to tell what is counterfeit.

Industrialists and business people, not involved directly in these hearings, will reap the cynicism and disillusionment coming from the disclosures.

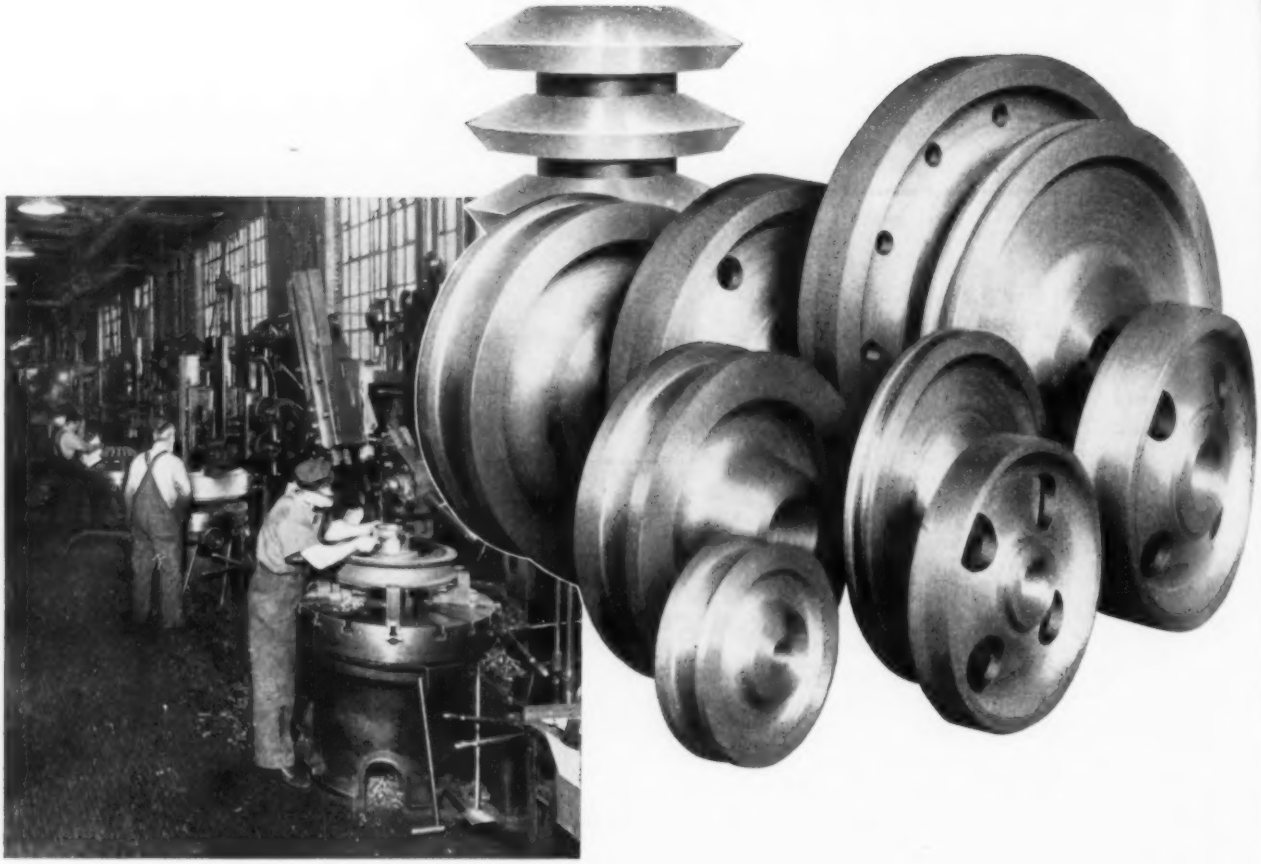
It will be harder than ever for management or for anyone else to convince our people that you get only what you work for—in the long run. It looks like the devil has had his day in court—or in committee.

The job of those who believe in honesty and good government must take hold in the "grass roots" and spread all over the country. Recent disclosures do not alter one iota the straightforwardness of the great majority of American people in or out of government, business and labor.

It looks like there is plenty of work cut out for a real leader—when he appears.

Tom Campbell

Editor



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Almost every machinery builder is constantly seeking ways to improve his product and keep his costs in line. Bethlehem circular steel forgings can help do both.

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BETHLEHEM ROLLED-AND-FORGED CIRCULAR PRODUCTS

IRON AGE *newsfront*

news methods and product forecast

► Recent research shows that hafnium content up to 8.2 pct does not affect the tensile properties of zirconium. A series of ten alloying elements have been made and tested. In general the oxidation resistance of zirconium is not improved through alloy additions.

► European shipbuilders are worried about their plate supplies. They are particularly worried about the rising plate shipments of European mills to this country.

► Without publicity the use of ramjets to power aircraft and missiles is still being pushed. Efficiency has been increased but fuel consumption is still enormous. Excessively high temperatures are still a major problem.

► Shortage of alloy and carbon bars is the most serious challenge to continual high auto production. April deliveries will probably not be met. Only a quick, complete reversal of this present trend can save today's auto schedule.

► The loss of core hardness in carburized boron steel parts has been licked without resorting to double treatment. The practice is to allow the parts to cool from the carburizing temperature down to about 1700°F and then quench.

► Standardization is the keynote of the new tank program. To keep engineering and tooling fluid in case of a long war, all tank engines will be of Continental design with interchangeable parts.

► Reports of sold-out mills continue to be fantastic. One Chicago mill is sold out on cold-rolled sheets for civilian use to May 1952.

► British Admiralty in refitting out three 8000-ton cruisers may use 8-in. automatic American guns which fire 4 times faster than the previous guns.

► During the first 6 months of fiscal 1951, 75.5 pct of Army purchasing was from small businesses. This represents 34.7 pct of the total dollar volume.

► Defense activity in Detroit has tied up 50 to 60 pct of the tool and die shop capacity now available. Some shops making jigs and fixtures are booked more than a year in advance.

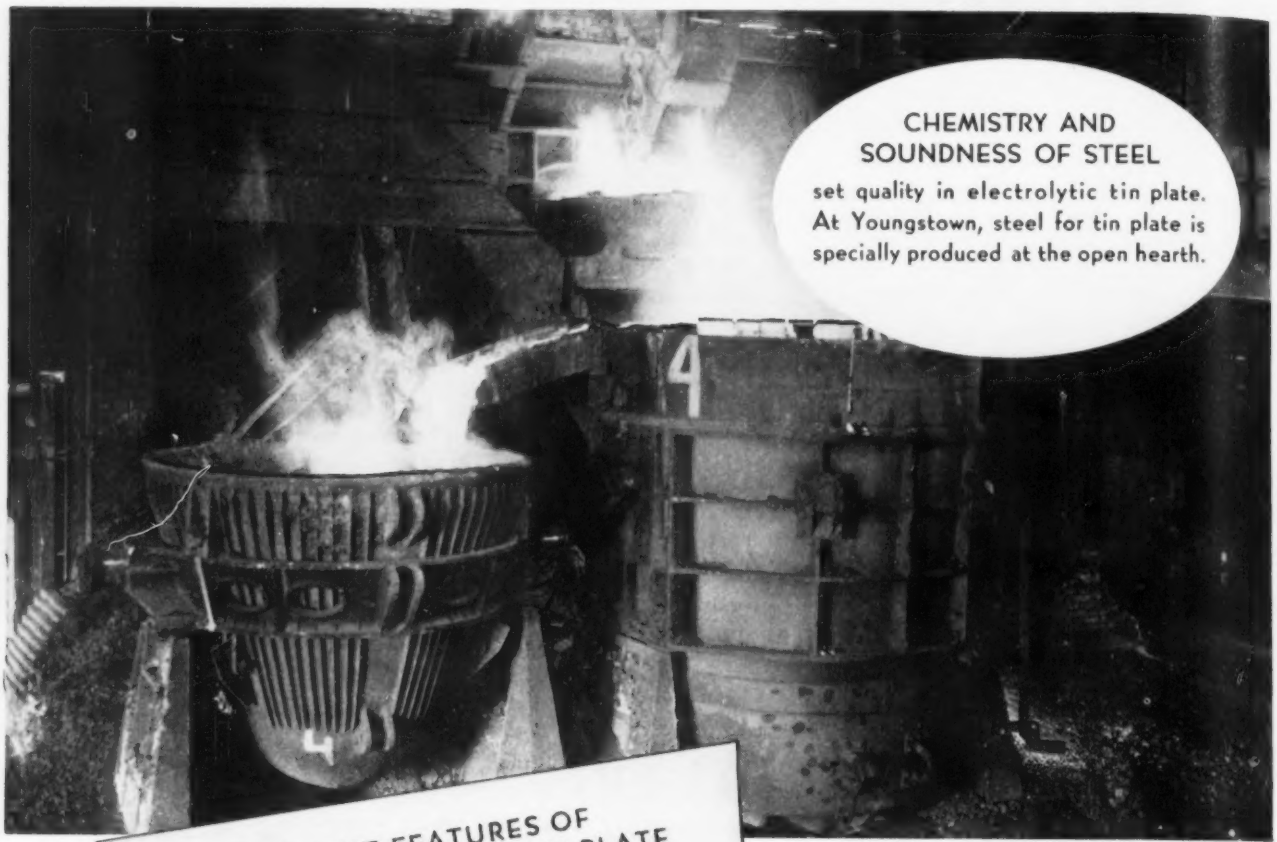
► Republic Steel, M. A. Hanna Co. and Jones & Laughlin are knee-deep in exploration for iron ore in Venezuela. Current exploration is on the Maria Louisa claim. These firms are also discussing the lease of San Isidro, a large deposit now in government reserves.

► Redesign of the large electric arc furnaces at Sorel, Canada, for beneficiating titanium ore has been completed. The present furnace is being rebuilt and the four new ones will be completed in 1952.

► A new type high-strength fastener now being used in aircraft assembly can be used at much lower operating cost than conventional bolts or other high shear-type fasteners, according to a top aircraft production engineer. They are installed pneumatically in one-third the time required for other fasteners.

ELECTROLYTIC TIN PLATE

Only as good as the steel from which it is made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IRON AGE *summary*

iron and steel industry trends

Big steel firms booked 50 pct on defense and essential civilian orders . . . Plates to 70 pct . . . MRO order will explode if it isn't changed.

Big Question—Where is all the steel going to? Steel buyers have been asking us that question for some time. After looking at the operating rate they say that they have been unable to account for the disposition of the steel that is being made. IRON AGE editors have been scouring the country for the answer to that question and have come up with information which will prove startling—even to those closely associated with the steel market.

Startling Answer—The answer is that defense and essential civilian programs now account for about 50 pct of all orders on the books of 2 of the nation's largest steel producers. Other steelmakers are not far behind in booking tonnage for essential programs. This does not include steel needed by the industry for its own expansion.

Another Eye Opener—On certain products the percentage booked for essential programs runs much higher. On plates, for example, one of the largest companies has more than 70 pct of its output booked for essential programs. Another large company has 72 pct of its plate output slated for these programs. Other products booked above the average for essential uses are structural shapes, bars, and hot-rolled sheets. This explains where all the steel is going to; it also explains why terrific shortages are showing up in certain products.

Double Check—In surveying the steel market, we think it is highly significant that reports from steel users coincide so closely with reports from steelmaking centers. Almost without exception products listed in shortest supply by steel users also reflect heavy DO and essential civilian booking by steel producers.

Oh, those alloy bars! In Detroit, bars (especially alloy) have replaced cold-rolled sheets as a measure of riches. Some auto makers have been trading sheets for bars, highlighting their fear that alloy bars will prove to be the Achilles heel of their ambitious production program. Several steel consumers have shifted their conversion business in order to have ingots made into bars instead of sheets.

May Will Tell—Like other steel users they are producing pell mell as far as they can go with existing supplies. They are unable to plan beyond the second quarter. There is a mad scramble by those in the know to insure as much tonnage as possible within the next couple of months. The full impact of heavy bookings of steel for defense and essential programs will begin to be felt in May.

MRO Means Help Yourself—Steel orders for repair maintenance and operation bearing the familiar DO-97 are stretching the present priority system toward the breaking point. Our immediate prediction that this order might be the straw that broke the camel's back as far as DO priorities were concerned still stands. Its impact on warehouses is terrific; some report 2 out of every 3 of their orders bear the symbol DO-97.

Warehouse Blues—Some warehouse people now say that they can handle only 10 pct of total business offered them. They report inventories off 60 pct over a broad range of products —much more on tight items such as plate, sheets and bars. The revision of the warehouse order (M-6) is expected to help them when it begins to take hold in June. But some April and May quotas will average only about 40 pct of shipments last year.

Steelmaking Record—Steelmaking operations this week are scheduled at 103 pct of rated capacity, up three points from the previous week. If equaled, this rate will yield another new all-time record of steel produced in a single week.

See "Can You Make It?"—new Iron Age subcontracting service on p. 111.

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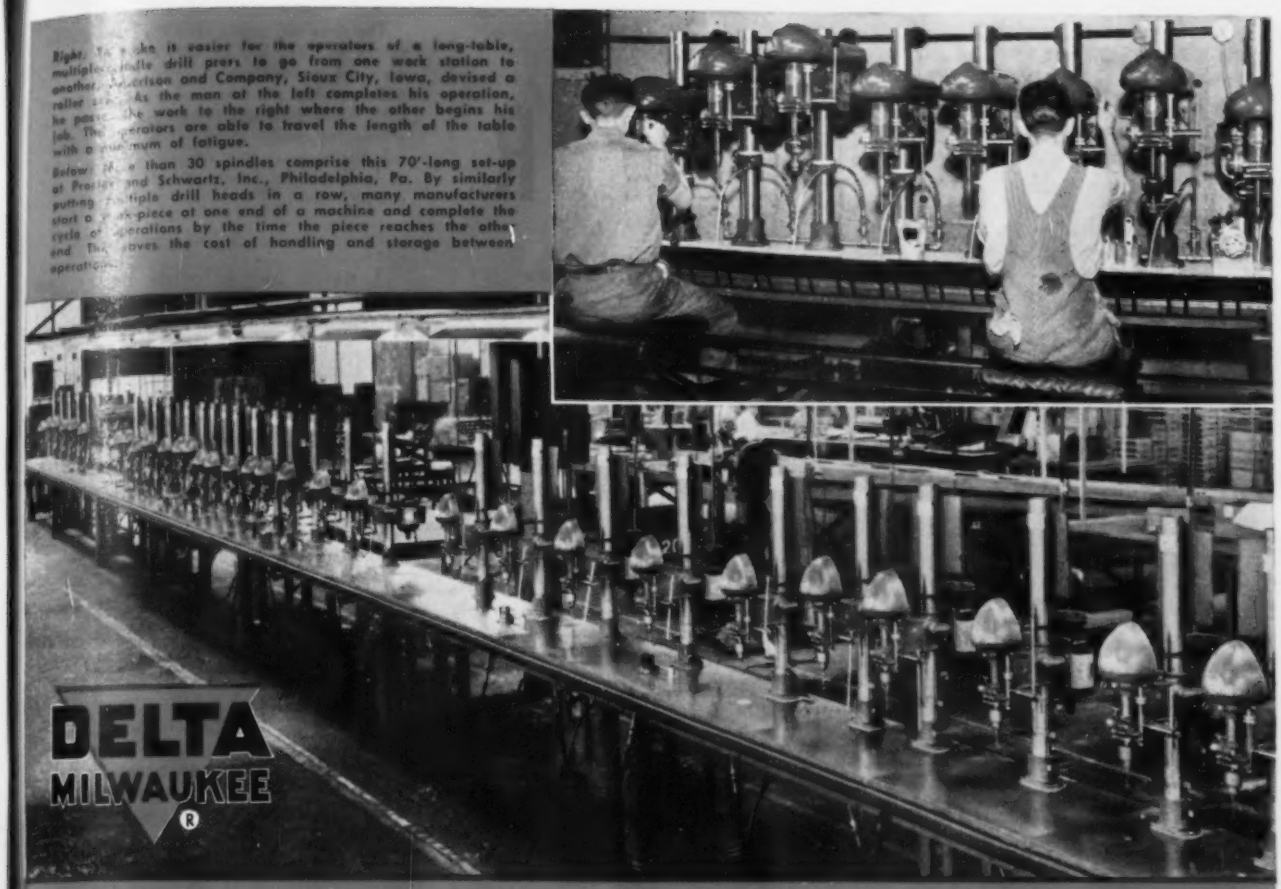
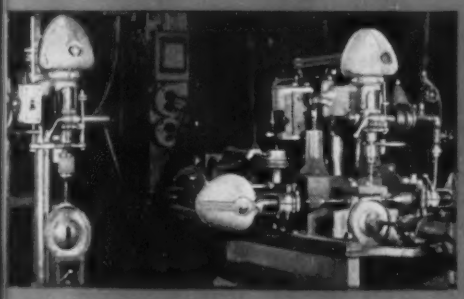


Right, [illegible] make it easier for the operators of a long-table, multiple-spindle drill press to go from one work station to another, Morrison and Company, Sioux City, Iowa, devised a roller [illegible]. As the man at the left completes his operation, he passes the work to the right where the other begins his job. The operators are able to travel the length of the table with a minimum of fatigue.

Below, [illegible] than 30 spindles comprise this 70'-long set-up at Prosser and Schwartz, Inc., Philadelphia, Pa. By similarly putting multiple drill heads in a row, many manufacturers start a work-piece at one end of a machine and complete the cycle of operations by the time the piece reaches the other end. This saves the cost of handling and storage between operations.

Fit the machine to the drilling job

–instead of making the job fit the machine



Time-Saving Idea! Above is a time-saving installation at The Deming Co., Salem, Ohio.

At the right is a special-purpose unit made up of three standard Delta 14" drill-press heads — two mounted horizontally and one vertically. All three drill holes in a casting at once, automatically.

While the machine is drilling, the operator takes the casting which has been drilled already and taps holes with the single-spindle Delta Drill Press at the left. Thus, he makes use of what is otherwise idle waiting time.

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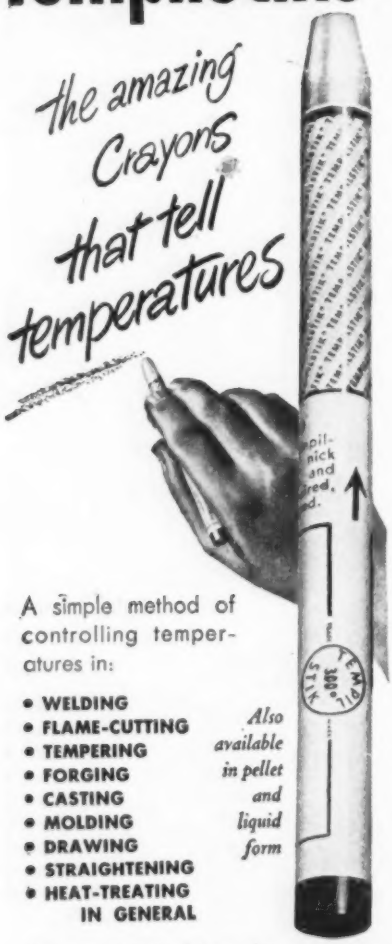

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Dear EDITOR

letters from readers

What Price Security

Sir:

After reading your editorial "How To Rook Yourself" in THE IRON AGE issue of Mar. 8 I felt compelled to write to you and compliment you on the arrangement and the collection of words which make up this editorial.

I can't recall having read anything in recent years which sums up our general trend so well in such simple and easy to understand words. The irony of the situation, however, is that many people are saying the same things in other words but few know what to do about it or will do anything about it if they did.

The fact remains that as long as a welfare state is continually promoted and there are a sufficient number of voters who are convinced security can be had by voting, and through the government, this trend will continue. How can this same voting public be convinced that this type of security can only be temporary or can continue only as long as the Treasury Dept. can continue to borrow money and inflate our currency?

The answer, at least partially, to that question seems to be a tremendous surge of effort on the part of comparatively few citizens with sufficient ability to "sell" the fundamental facts which in truth are genuine security and to urge everyone that the only way to retain it is to re-earn it often enough to assure, without the shadow of a doubt, its continuous presence in our economy. This is a tremendous task which we apparently seem not yet ready to undertake.

G. K. KLEEBERG
Production Supt.

Tibbetts Industries, Inc.
Camden, Maine

We have wondered: where we are going; if we will stop in time; and what the percentage of the so-called moral disintegration is today.

Frankly, we don't know the answer. We feel pretty much the way you do in your last sentence.

We are a rich country; there is still plenty of opportunity; and we probably can go a long time seeking unearned security before we have to pay up. It is pretty hard to convince a person who is enjoying a cherry sundae that the ice cream may run out in 100 years and there may be no more cherries in 105 years.

Maybe we have exchanged our goal of perfection for one of mediocrity. We also unconsciously feel the lack of leadership which stirs us to do big things.

The time will come when the people themselves will get fed up with the phony peddlers of nonexistent security. How long it will take we do not know. We must start with the grass roots to combat the drift towards the social state. It is an individual job because we are all part of the whole. A leader—who leads—could start the ball rolling.—Ed.

Sir:

I would like to write just a few brief lines to give you my impression of the editorial "How To Rook Yourself." I am not an executive but a secretary in the office of one and I doubt if he shares my opinion on this subject.

Too many people have voiced their rather cynical criticisms of the economical plans of today without giving any constructive plans of their own. Yes, I could laugh at some of the things you wrote but I also felt rather sorry for your warped thinking. Let's put forth some good ideas instead of just telling us what we all know—that things are in rather a sorry mess. Every time we pick up a paper we can see how bad things are.

I will add enough lines to this letter to tell you that your editorial was very well written—an excellent satirical piece but surely not what you could do if as a conscientious American and editor of an important magazine you really felt the condition serious enough to do more than poke fun at it.

NAME WITHHELD

Sometimes satire is needed to hammer a point.—Ed.

Iron For Scaifes

Sir:

I would like to know where I can obtain iron casting suitable for making scaifes for lapping diamonds. The iron used for these scaifes has been termed as Belgium iron. Have you ever heard of this term?

E. LEIBHARDT

Edw. & Jos. Leibhardt
Maywood, Ill.

The diamond people tell us that this iron is imported and that it is available in only very small quantities.

We suggest you contact Leon C. Rucquoi, 30 Rockefeller Plaza, New York 20, N. Y., who is a technical adviser to some of the Belgian mills.—Ed.

Iron Powder Zooming?

Sir:

We read with interest the article in your Feb. 15th issue "Ordnance Holds Key to Vast Iron Powder Growth." We are anxious to know whom we would contact in the Ordnance Dept. in connection with this program.

E. J. RAUB
General Manager

Falls Hollow Staybolt Co.
Cuyahoga Falls, Ohio

Send your inquiries to Industrial Division, Ordnance Corps, Pentagon, Washington 25, D. C.—Ed.

Disposal Problem

Sir:

The excellent article in the Mar. 8 issue of THE IRON AGE entitled "Pickle Liquor Disposal Can Pay Off" by F. D. Jones has started another train of thought regarding disposal of phosphoric acid pickle liquor.

Have you ever featured any article regarding recovery of phosphoric acid other than the process perfected by the Pernutit Co., known as the Hydrogen Zeolite process?

W. H. EVANS
Special Assistant

Hofmann Industries, Inc.
Sinking Spring, Pa.

We haven't had any recent articles on phosphoric acid recovery. However, the articles "Regeneration System for Pickle Liquor" (Sept. 30, 1948, p. 60) and "Lime Treatment of Waste Pickle Liquor" (June 26, 1947, p. 45) may be of further interest to you.—Ed.

Heating Innovation

Sir:

We are interested in the possibilities of utilizing the method of electric heating through radiation from a bath of molten glass, a method which was developed by Dr. V. Olivotto of Turin, Italy. In the June 15, 1950 issue of IRON AGE you printed an article by Donald L. Campbell, manager of overseas sales, Electric Furnace Co., Ltd., London.

I would like to know whether the Electric Furnace Co., Ltd., has a representative in the United States whom we may contact for further information.

E. B. STORY
Chief Metallurgist

A. M. Byers Co.
Pittsburgh

We have been advised that the Electric Furnace Co., Ltd. of London has no representative in this country. We suggest, therefore, that you write direct to Mr. Campbell, author of the article.—Ed.

Low Priority

Sir:

We have plans for a steel pipe mill making pipe up to 2 in. and are interested in incorporating into that mill the "Ugine-Sejournat" process, the extrusion process as used by the National Tube Co. at the new plant in Lorain, Ohio.

Would you please advise us who the manufacturer of that equipment was?

F. J. BENTZ
Secretary

National Plumbing Fixture Corp.
Ellwood City, Pa.

Your best source for information on the French extrusion process would probably be J. Sejournet, General Manager, Comptoir Industriel d'Etirage et Profilage de Metaux, Persan, France.

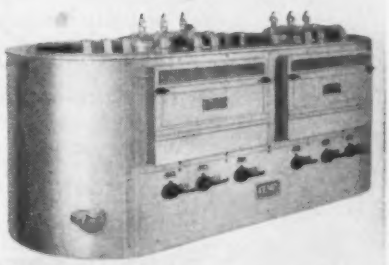
We do not think National Tube Co. is using this process yet, although they have a license to use it. As far as we know, it will not be used to make standard pipe; costs would be too high. It will be used to make alloy and special tubing.—Ed.

Actual reports show:

KEMP

Cuts Melting Costs

Above is a 44" pot with 10,000 lb. capacity. Casting rate: two tons per hour. Estimated fuel savings of up to 40%.



Many newspapers report actual fuel savings of from 50% to 60% on fuel with 10-ton capacity melting pot shown above.

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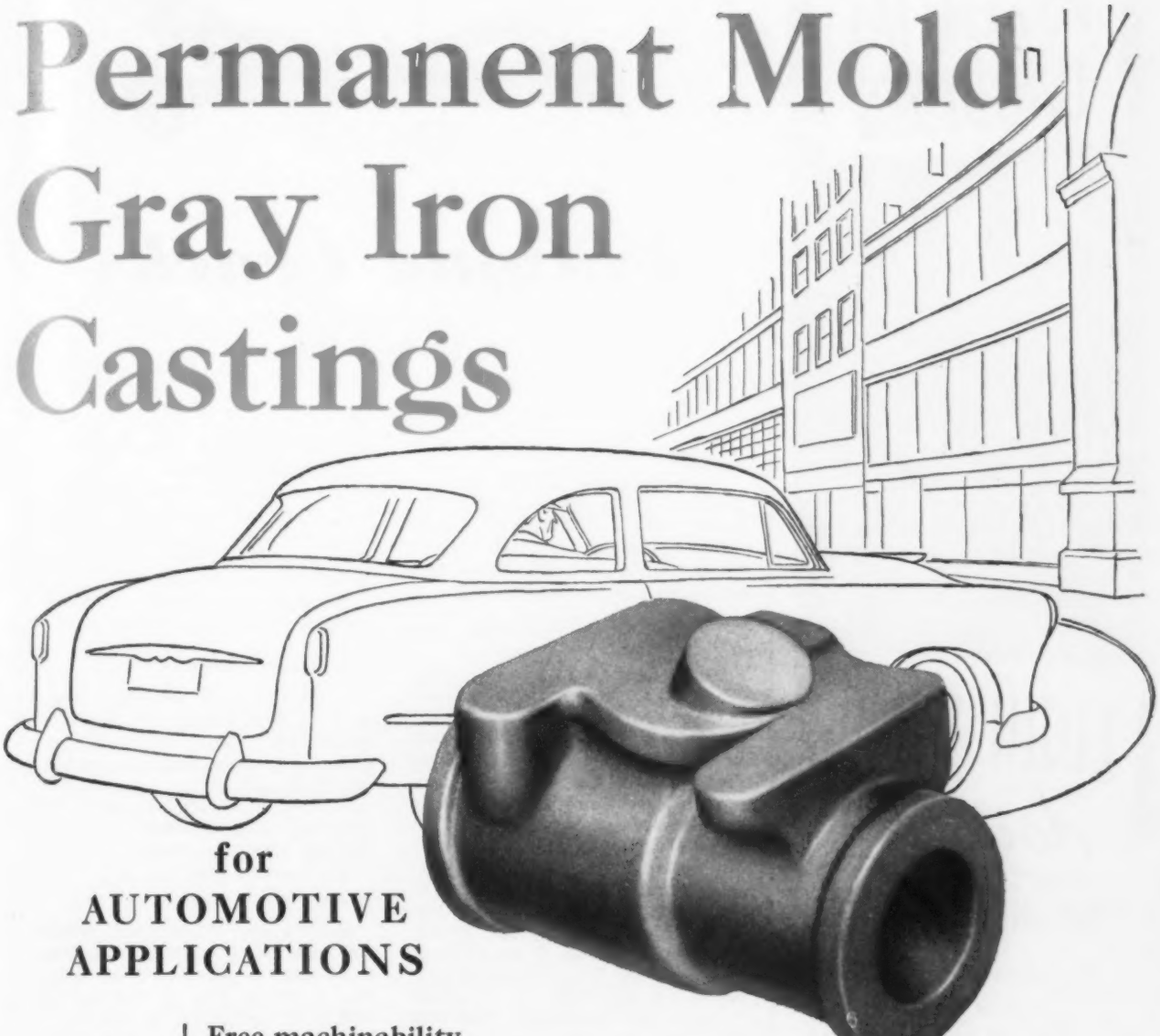

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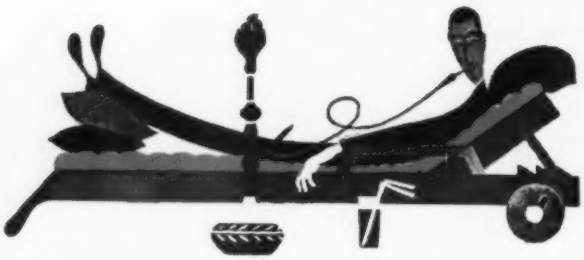
ELGIN, ILLINOIS



Fatigue Cracks

by Charles T. Post

Washington Note

Price Stabilizer DiSalle has ordered the equipment branch of Office of Price Stabilization to remove all metal desks from the Forest Products Div. of OPS. They will be replaced with wooden desks.

Secretary's Game

For the benefit of posterity Editor Tom Campbell recorded a sparring session between two secretaries over which one should put her boss on the long distance wire first. When the recording was transcribed there were no quotation marks.

"Just a minute, Mr. Jones, I have Mr. Plutz for you. Yes, Mr. Plutz, this is your call. Just a minute, Mr. Jones, here is Mr. Plutz. No, Mr. Plutz, this is not Mr. Jones. Operator, operator, I am holding Mr. Jones for Mr. Plutz—will you please put Mr. Plutz on. No, this is Mr. Plutz's secretary. Will you please put Mr. Jones on. Just a minute, this is the long distance operator.

"Did you get Mr. Plutz, Mr. Jones? I am ringing him. Just a minute, Mr. Jones, I have Mr. Plutz for you. No, Mr. Jones, this is not Mr. Plutz. Oh, you are Mr. Jones' secretary Well, dearie, will you please put Mr. Jones on, I have Mr. Plutz. Mr. Plutz, here is Mr. Jones. (Censored.) I am sorry, I will have to report that kind of language to the supervisor. Just a minute, please, this is the supervisor; can I be of service to you, Mr. Jones. (Censored.) No, Mr. Jones, I cannot do that for you; it is against the rules. Sorry, Mr. Jones, here is your call to Mr. Plutz. Hello, this is Mr. Plutz's office, Miss Flatbottom speaking. Yes, I have Mr. Plutz; will you please put Mr. Jones on. What's that you say—Mr. Jones has been taken to the hospital. So sorry, I will tell Mr. Plutz that Mr. Jones has called; will you please give me the number of the hospital so I can have Mr. Plutz ready when Mr. Jones is on the line?"

It never could have happened in the days of male secretaries.

First Shoot the Deer

Under the Feb. 19 amendment to NPA Order M-29, the National Production Authority permits "the processing of individually-owned deerskins into items for personal use or gifts." Formerly, all deerskins had to be processed to meet military glove specifications.

Puzzlers

E. A. Perry, Washington, points out that the second hand traveled 26.06 miles a year and J. H. Britton, Colorado Fuel & Iron Corp., and B. McClenachan, Bendix Aviation Corp., counted the right number of clicks.

The family tree of the butchers and bakers was put in order by R. A. Dickson, Central Hudson Gas & Electric Corp.; C. E. Norton, Chicago; C. I. Gardner, New York; C. E. Blass, Talon, Inc.; M. M. Cooledge, Buckeye Steel Castings Co.; A. T. Wolak, Harris Hub Co.; R. J. Bagby, Bagby & Co.; R. Alvis, Tennessee Coal, Iron & Railroad Co.; R. C. Gray, Gray Wire Specialty Co.; C. G. Heilman, Commonwealth Industries, Inc.; A. F. Christensen, Jarvis Engineering Works.

Mr. McComb, Jarvis Engineering Co., wants to hedge against rising meat costs but he only has $100 to invest. He wants to know how many cows at $10 each, pigs, $3 each and chickens, 50¢ each he can buy with his money. We hope he doesn't overlook the cost of feed.

machine tool high spots

sales inquiries and production

by W.A.Lloyd

Withdraw Prices—A growing number of machine tool companies were withdrawing prices and quotations this week in the continued absence of a workable price ruling by Economic Stabilization Agency.

Nothing is official but meetings between industry representatives and ESA officials are reported to have ended indecisively.

Reports that machine tool prices will be rolled back to the June 25, 1950 level persist. However, actual increases in the cost of materials and labor since that time will be allowed, also higher costs of normal subcontracting, chucks for example.

This is an improvement over the 10 pct increase over base first suggested, but leaves profit and overhead at the June 25 level. Companies that can mass produce machines will be able to make out under this, if it should become official. Another meeting is scheduled this week.

Foreign Business—The British want to double the number of machine tools for their rearmament program. One U. S. builder reported receiving an inquiry for 200 lathes. The British have an estimated 3800 machine tools on order for the first phase of their rearmament program and are pressing for delivery.

Machines for the second phase are being tentatively scheduled for 1954 by some companies. The British wanted delivery before the end of 1952. Some companies are having trouble keeping up with deliveries for the first phase of the British program, placed 6 months ago, when as much as 50 pct of machine tool companies' business was foreign.

British Machines to Europe—Orders for these machines will be paid for by the British treasury and at this time these machines are not going into MDAP, being held out as bait to get the British to use more than 40 pct of their own machine tool production for their rearmament program.

According to reports, the British are selling to the European market machines of their own manufacture that are the same type they are buying from the U. S.

The Pool — An allotment of $100 million for pool orders was reported this week, a drop in the bucket in terms of the entire program, which is expected to require $800 million.

Priorities — By semi-official count, 35 separate "DO" numbers have been authorized, each identifying a program and having the same standing. Three of these numbers, DO-19, DO-21 and DO-98, are of particular importance to the machine tool industry, since most rated orders the industry receives will carry one of them.

DO-19 was recently established for machine tool orders for defense departments, Atomic Energy Commission, contractors or subcontractors, where the government pays for machine tools, or which may become government property, for machine tools for existing ships or existing mobile ordnance field repair shops.

New Application—DO-21, until recently applied to the foregoing, will no longer be used for machine tools. It will be applied on orders for other types of manufacturing equipment from defense departments, Atomic Energy Commission, contractors or subcontractors, purchased with government money, or which may become government property.

Machine Tool Index—In Cleveland, preliminary index of new orders for machine tools in February rose to 615.8, compared with 475.4 in January, reports NMTBA.

Preliminary index of foreign orders, which are included in the total, was reported at 80.1 compared with 61.3 in January. Shipments rose to a preliminary index of 122.2 in February, compared with 114.3 in January. Ratio of unfilled orders to shipments is now 20 to 1.

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Friction Sawing

Entitled "Friction Sawing—Past and Present," a 14-p. report tells how friction sawing of cold steel is being used in an increasing number of applications. Principles of the process are described, and details are given on a number of specific applications. Various cutting data are tabulated, demonstrating that this method permits faster cutting than with any other process except shearing, and can be adapted to many varied structural shapes without change of blade or setup. *Kling Bros. Engineering Works.*

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Modern Barrel Finishing

An authoritative new 20-p. treatise on advanced barrel finishing illustrates and describes the full range of application of this new finishing technique. Information is given on all phases of Supersheen finishing. Many "before and after" pictures are shown, together with modern equipment and full information about abrasive chips and compounds employed in advanced barrel finishing. The booklet will prove helpful to manufacturers who finish metal parts of any description. *Almco Div., Queen Stove Works.*

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Speed Reducer

The Strateline speed reducer, offering speed reductions from 3:1 to 10,000:1 and input range of 1/20 to 10 hp, is shown in a new series of data sheets also covering the Varatio positive variable speed gear box. The speed reducer made by this British company is described as having co-axial shafts, and can run either clockwise or counter-clockwise without alteration, is compact, and has a maximum output torque of 25,000 lb. The gear box shown covers a range of ½ to 25 hp and has overall ratios of 2:1, 3:1 and 4:1. *Varatio-Strateline Gears, Ltd.*

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Steel and Castings

SWB high-speed tool and die steels, high-tensile alloy steels, special steels and forgings, steel castings, and quality sheets are described in a series of three booklets covering the products of this German company. The tool steel booklet gives complete information on composition, heat treatment and applications of more than 60 types, both alloyed and non-alloyed. Numerous examples are shown of castings that have been made in normal and special qualities, raw or machined, up to 50 tons in weight. *Stahlwerke Bochum A. G.*

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A new bulletin designed to aid defense plants in solving their floor resurfacing and repair problems describes Swift-Floor, over which traffic can roll within 60 sec after application. It also lists application methods designed to eliminate factory production delays necessitated by the use of ordinary flooring materials. The bulletin tells how this material can be applied over wood, concrete, brick or steel, indoors or out, can be laid without moving machinery or heavy equip-

Turn to Page 122

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Rotary Cutters

Completely form cutting—cutting edges follow the entire form.

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For more data insert No. 16 on postcard.

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Factory preset; opening-closing differential temperature, 15°F up.

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Silver Brazing Rings

For fast, economical, improved brazing of ordnance equipment.

Flat wire No-Tangle notched-coil stress-relieved silver brazing and soldering rings are designed for applications requiring larger volume of silver alloy for added strength in critical joints and where the depth and shape of the groove prohibits use of round wire rings. Flat wire rings can be made in unlimited, job-determined diameters and wire thicknesses in butt, lap and gap form. Because they are flattened to individual job specifications, the new rings are said to provide a more complete fill and stronger, leak-proof bond. The new line of rings is available in Sil-Fos and Easy-Flo wire. *Lucas-Milhaupt Engineering Co.*

For more data insert No. 18 on postcard.

Platform Beam Scale

Designed for fast accurate low-cost industrial weighing applications.

Called the Load King, the new scale is primarily for heavy-duty industrial applications where shock-loading is the rule. The lever system in the platform, and other key parts are all-steel. Poises on the main bar are mounted on roller bearings for rapid positioning. A 100 pct end loading platform gives the same reading regardless of the

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production ideas

Continued

location of the load on the platform. Pit requirements for the Load King are 11 in. Capacities range up to 6400 lb. *Yale & Towne Mfg. Co.*

For more data insert No. 19 on postcard.

Forced Induction Pump

Features power-operated elevator for heavy lubricants and materials.

For delivery of heavy lubricants, and mastic materials that will not readily seek their own level, a new hydraulically-operated, single air ram elevator is used with heavy duty, DeLux air-motor operated drum pumps. The manufacturer claims the unit will exert 7110 lb pressure on material and will completely empty and clean sides of 400-lb or 500-gal drums. The unit has an air ram with three-position control valve for raising, lowering, or holding pump and follower assembly in desired position, and an air regulator with gage controls air pressure required for forcing pump and follower assembly against material. *Lincoln Engineering Co.*

For more data insert No. 20 on postcard.

Neoprene Airdry Coating

For industrial maintenance work on structural steel, concrete, wood.

Properties of Neoprene airdry protective coating are resistance to oil, grease and chemicals; resistance to age-cracking by sunlight, weather and ozone. It also possesses the characteristic properties of any rubber product—resilience, elasticity, high order of abrasion resistance, non-chipping and non-cracking. The airdry coating is a solvent solution of a specially developed Neoprene composition; it will not gel or set up in the container, but will cure at normal temperatures after the solvent has evaporated. The material is applied by brush or spray gun in a single coat of 5-10 mils thickness. *Gates Engineering Co.*

For more data insert No. 21 on postcard.

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Name ..... Title ..... Company ..... Co. Address .... THE IRON AGE, New York 17	3/29/51 ☐ Fill in above the number of the item on which you need further data.
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Scale Unit

Makes old fashioned beam scale an automatic, flashing exact weight.

A weighing accessory, the new 77 Weightograph, can be attached to any make of beam scale, or to any scale convertible to beam operation. It features a non-protruding periscope with a convenient eye-level screen that instantly flashes the exact weight in large, illuminated, crystal-clear figures for easy, speedy and accurate reading. It is designed with the latest methods of optical projection which increases image brightness and contrast five times. The image is read off the mirror. The reading line length is 180 in. *Howe Scale Co.*

For more data insert No. 22 on postcard.

Safety Valve

Moves to safe position if air or electrical supply is interrupted.

An important feature of a new safety valve is the elimination of all springs. This, together with the use of a clapper type solenoid, adds materially to operators' protection. Ful-flo orifice provides maximum capacity. The major pistons and poppets are tied together in one unit to assure simultaneous movement, and an oversize exhaust gives faster control. Free and continuous operation is provided by floating the pilot operating lever on needle bearings. Valves operate with line pressures of 40 to 125 psi and are available in ¼ to 1¼ in. pipe sizes, straightway or 3-way, normally closed or normally open models. *Ross Operating Valve Co.*

For more data insert No. 23 on postcard.

Power Press Brake

Offers bonus bending length in a low price press brake.

Model 1510 power press brake enables one to work longer lengths of lighter metals—up to 10 ft of 18 gage mild steel. It is said to give the same features in economy, durability and accuracy found in the company's other press brakes. *Airtherm Mfg. Co.*

For more data insert No. 24 on postcard.

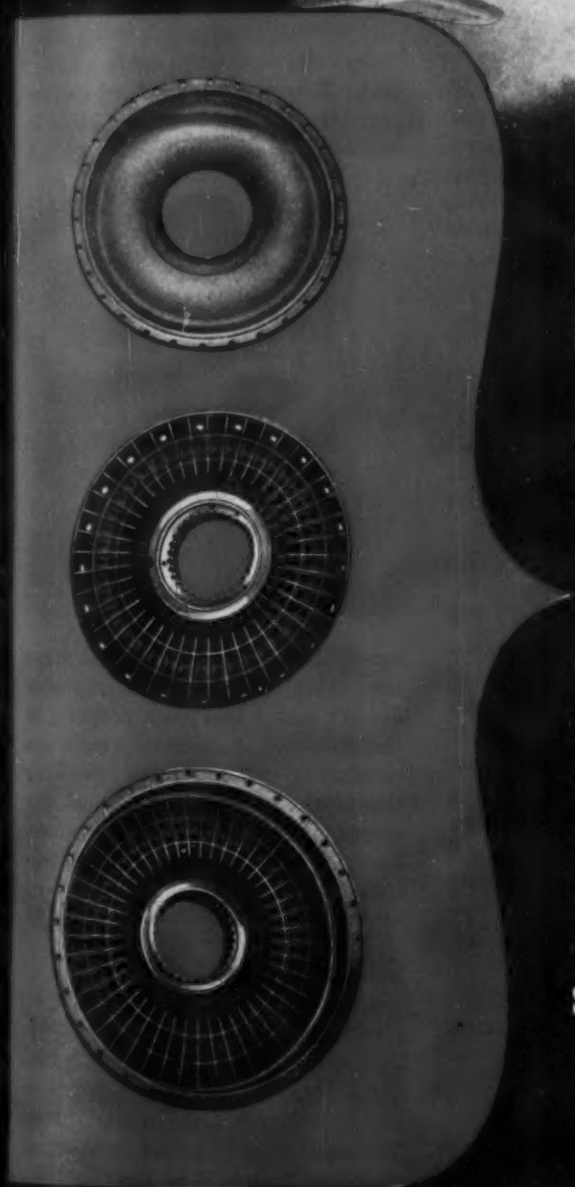
Vertical Miller

Electronic control for all feeds.

Designed for heavy-duty milling and die sinking operations, the improved No. 4 vertical miller features electronic control for all feeds through a master control station

SHARON ALLOY*

Performance Plus for Aircraft Builders



The variable speed gear-driven superchargers that provide the added boost needed by many of today's larger aircraft, require steel that is tough enough to withstand the high heats, speeds and unit loads without giving way to fatigue and distortion; a steel that can be copper brazed and otherwise fabricated without a loss of strength; a steel that can be delivered with constant uniformity in a close tolerance range to guarantee the delicate balance so important to the part.

Parts pictured here are for hydraulic coupling—the heart of the supercharger—made of special Sharon chrome-moly alloy that exactly fits job requirements.

*Specialists in Stainless, Special Alloy and Coated Strip.

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Sharon, Pennsylvania

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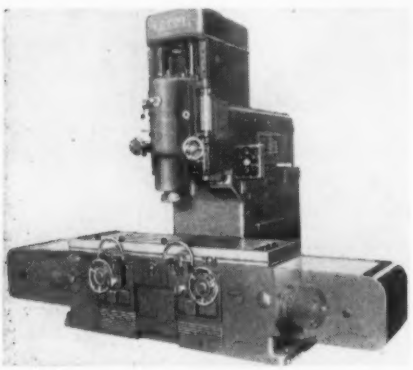
production ideas

Continued

containing spindle start, stop and jog pushbuttons, dials for controlling speeds of table, cross slide and vertical slide, selector switch for the two slides, and emergency master stop pushbutton. The machine is offered in 48 and 60-in. capacities, the latter with working surface of 24x96 in., the former with 24x84-in. working surface. Two 3-hp ac motors, one for the table and one for the cross slide, power rapid traverse motion, that has been increased in the two



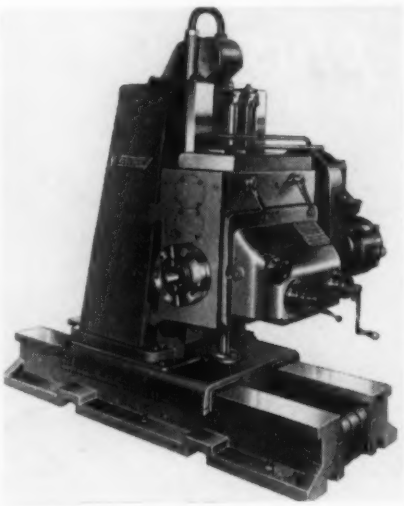
models to 180 ipm. The feed rate is constant, preselected and controlled by the position of potentiometers located on the pushbutton station. The spindle is reversible, driven by a 10-hp 1200 rpm motor. Three 1½ hp motors, with electronic control to provide infinitely variable feed rates, drive the table, cross slide and vertical slide. Range of drives is ½ to 25 ipm. *Reed-Prentice Corp.*

For more data insert No. 25 on postcard, p. 35.

Boring-Facing Machine

Greater rigidity for cutting tool; conventional overhang eliminated.

In designing the boring and facing machine, the conventional overhang for necessary bar travel has been eliminated, thereby providing greater resistance to bending stresses when boring, greater rigidity when milling, and increased capacity when facing. Rigidity is obtained because the entire spindle housing, with its standard A.S.A. No. 50 milling machine spindle nose, moves into the face of the workpiece, avoiding a long overhang. This factor reduces vibrations, increases permissible feed and depth of cuts, assuring very close tolerance, and decreasing production time. The machine can be



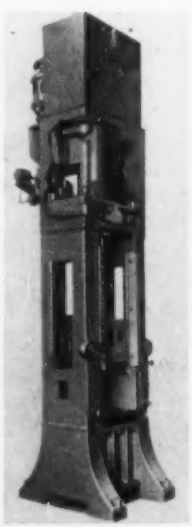
mounted as a stationary unit on a concrete foundation. As a portable machine, it can be mounted to suit and anchored to sectional floor plates that accommodate cumbersome workpieces. A large U bolt at the top of the machine facilitates moving it by crane. The machine weighs 10,000 lb. *Forneys, Inc.*

For more data insert No. 26 on postcard, p. 35.

Metalworking Presses

With pipeless circuit construction.

A new principle in hydraulic press construction is the pipeless main hydraulic circuit incorporated in the new Elmes metalworking presses. The only pipes in the entire press are the pilot, suction, and drain lines, and only the pilot line carries high pressure. All high-pressure fluid is conducted through short, direct passages drilled in the structural parts. Smooth and shockless operation virtually eliminates vibration. These advantages are claimed to make for low-cost maintenance, with downtime practically elimi-



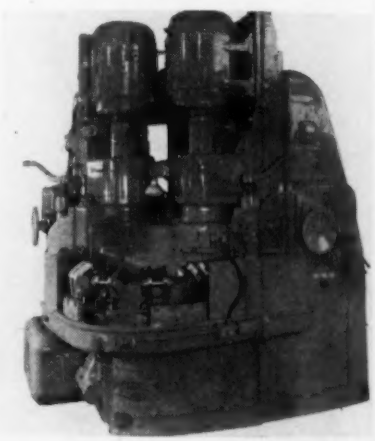
nated. The pumping unit can be removed as a unit assembly without disconnecting any piping. The valve unit, located in the oil reservoir, is also removable as a unit assembly. All pumping units and valve groups fit standard bolting and drilling layouts, providing flexibility in the variety of possible pumping arrangements. Reversing type hydraulic pumps are used in the new circuit. The pipeless valve unit is said to be the heart of the new circuit, containing necessary provisions for pre-filling during rapid advance, changing to pressing speed by either pressure or position, and decompression prior to reversal. *Elmes Engineering Div., American Steel Foundries.*

For more data insert No. 27 on postcard, p. 35.

Rotary Surface Grinder

With fixture for finishing covers of automotive oil pump bodies.

On the specially equipped No. 24A2 Hanchett type rotary surface grinder, workpieces are held in automatic clamping fixtures. A



safety device is provided that stops the table in case the operator doesn't locate the work properly in the fixture. Automatic sizers are constantly in operation checking the work and keeping all of the pieces within the specified tolerances without the operator's attention. *Mattison Machine Works.*

For more data insert No. 28 on postcard, p. 35.

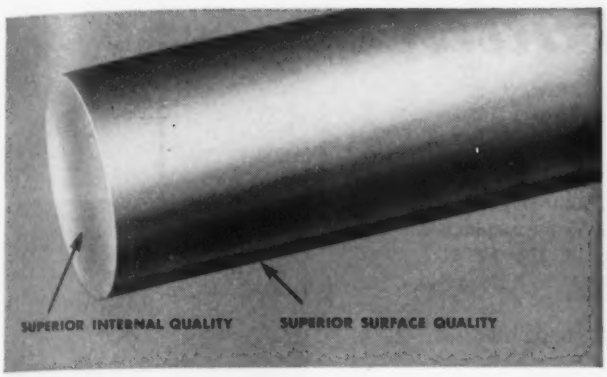
Slitter Knife Grinder

For grinding precision circular knives accurately and economically.

A new slitter knife grinding machine may be used for manufacturing or resharpening circular knives. The maximum diameter knives that

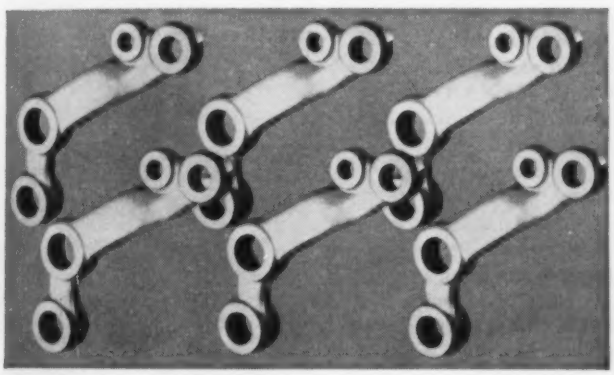
Turn to Page 126

3 ways TIMKEN® steels help you make better forgings —at lower cost!



1 HIGH QUALITY! The superior surface and internal quality of Timken® forging steels, plus their uniform forgeability, gives you better finished forgings—with fewer rejects, delays and shop-practice changes.

2 TAILOR-MADE! Using advanced melting and finishing techniques, Timken makes certain that chemical and physical properties will meet your specifications exactly.



3 UNIFORM! From bar to bar and from heat to heat, Timken forging steels give you uniform composition, uniform forgeability and uniform response to heat treatment. That's assured by Timken's rigid control and inspection methods.

For better forgings at lower cost, get the recommendations of our Technical Staff. And for a complete catalogue of our steels, "Timken Steel Products", write on your letterhead to The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

TIMKEN
TRADE-MARK REG. U.S. PAT. OFF.
Fine Alloy STEEL and Seamless Tubes

Specialists in alloy steel—including hot rolled and cold finished alloy steel bars—a complete range of stainless, graphitic and standard tool analyses—and alloy and stainless seamless steel tubing

IRON AGE *introduces*

Edwin Vereeke, appointed sales manager, with charge over all sales and advertising for the HEIL PROCESS EQUIPMENT CORP., Cleveland. Other appointments: **Robert Peters**, sales engineer for the area west of Cleveland; and **Ken Grader** as sales engineer in charge of the area east of Cleveland.

Opal Kane, appointed manager, mining division and **J. S. Chapman** assistant to the manager, mining division, of ARMCO STEEL CORP., Middletown, Ohio.

George B. Isett, named sales and service engineer in the Chicago district for BROOKS CHEMICALS, INC.

Robert C. Allen, appointed treasurer of the CRO-PLATE CO., INC., Hartford, Conn., and **Alan R. Burman** was named vice-president.

Herbert J. Allemang, appointed vice-president-executive staff of PHILCO CORP., Philadelphia. Mr. Allemang in his new capacity will head the forward planning program of the company.

Richard K. McCreery, appointed general sales manager of the BRAINARD STEEL CO., Warren, Ohio, a subsidiary of Sharon Steel Corp.

Charles A. Marshall, elected president of NEWHALL-MARSHALL-WOOD, INC., New York.

Theodore E. Spilker, elected a vice-president and secretary of NICE BALL BEARING CO., Philadelphia. **John E. Mullen**, formerly plant manager, was made a vice-president, and **Henry M. McAdoo**, was advanced to the position of plant manager.

Robert R. Nadal, appointed general sales assistant to the vice-president-sales and advertising of the FORD MOTOR CO., Dearborn.

Sidney J. Sabourin, appointed as plant manager and **Bart Cotter** as chief engineer of the Fisher Body Grand Blanc, Mich., tank plant of GENERAL MOTORS CORP.

G. Millard Whitney, named manager of WYANDOTTE CHEMICALS CORP., Syracuse, N. Y. district.

Delphine S. Byrne, advanced to the position of advertising and sales promotion manager of the H. M. HARPER CO., Morton Grove, Ill.

John J. Egan, Jr., appointed regional manager, Cleveland, for LAMSON CORP.

Deane R. Ebey, named assistant manager of the plastics sales division of the DOW CHEMICAL CORP., Midland, Mich. Mr. Ebey succeeds **William R. Dixon** recently appointed assistant general sales manager of the company.

Morton Chatkin and **Edward L. Hughes** named as assistants to the president of the LEVINSON STEEL CO., Pittsburgh. Mr. Chatkin and Mr. Hughes will both serve as members of the company's management committee.

J. J. Martin, appointed vice-president in charge of operations of the CLAYMONT STEEL CORP., Claymont, Del.

Jonathan N. Rawson, appointed director of industrial activities by BROWN & SHARPE MFG. CO., Providence.

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D. S. SMITH, elected president and chairman of the board of Perfection Stove Co., Cleveland.

R. F. MERWIN, elected president and general manager of Erie Mfg. Co., Erie, Pa.

RAYMOND H. SCHAEFER, elected a vice-president of American Brake Shoe Co., New York.

IRON AGE *salutes*

Frank R. Nichols

IF Frank Nichols weren't literally revolutionizing the merchant wire aluminum industry he would be succeeding in some other way. He's that kind of guy—bound to succeed because he's smart and people like him.

You like him when you first see him, and you like him more when you get to know him. He's highly intelligent but very much a regular fellow. He has a quiet, friendly manner, makes friends without seeming to try. And his firm confidence is contagious. Business acumen? He's loaded with it, though he's certainly not a sharpy. Talking with him is like reading tomorrow's newspaper.

As a frontline salesman for Pittsburgh Steel, Frank learned the metalworking market upside down. He learned all about customers, how they like to be treated. He also learned a lot about the potential market for aluminum.

After the death of his father he reorganized the Nichols Wire & Steel Co.; changed its name to Nichols Wire & Aluminum Co.

But that was only the beginning. A while later he happened to see in a foreign magazine a short notice of a Properzi machine for continuous casting of lead and zinc. This tickled his imagination. Why not aluminum?

He sent his executive vice-president and his chief engineer to Milan, Italy. On their recommendation he bought a continuous casting unit and rolling mill.

After slight alteration of the equipment, he became the first to continuously cast and roll aluminum rods on a commercial scale. Now he's making them faster and cheaper than they've ever been made before. That's why industrialists visit Davenport, Ia., to see this revolution in aluminum wire products.

ROBERT J. STODDARD, elected vice-president of engineering of American Hoist & Derrick Co., St. Paul.

DONALD M. LAFLIN, appointed general sales manager of Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.

FRANKLIN W. PETERS, appointed assistant to the vice president—coal division, U. S. Steel Co., Pittsburgh.

ALFRED FLEISSIG, named director of purchases and contracting for Hydropress, Inc., New York.

IRON AGE *introduces*

Continued

Paul B. Baird, promoted as manager of standard pipe sales for the YOUNGSTOWN SHEET & TUBE CO., Youngstown, Ohio. **Carl T. Selander,** formerly western representative for the company, is now assistant manager of standard pipe sales in Chicago.

William E. Harvey, appointed vice-president in charge of production of carbon and graphite for the SPEER CARBON CO., St. Marys, Pa.

R. W. Morrison and **J. P. Johnson,** elected to fill newly-created directorships at the ARO EQUIPMENT CORP., Bryan, Ohio.

Dr. Thonet C. Dauphine, appointed manager of sales development of HOOKER ELECTROCHEMICAL CO., Niagara Falls, N. Y.

Wallace B. Strathdee, named manager of the marine and industrial departments and **H. Raymond Benson** is the new manager of the transportation department of WESTINGHOUSE ELECTRIC CORP., Boston.

D. T. Turnbull, elected treasurer and **J. M. Goodson** has been made auditor of WOODWARD IRON CO., Birmingham.

William R. Wilkinson, appointed vice-president for sales of JOHNS-MANVILLE CORP., New York. **Kenneth W. Huffine** has been appointed vice-president for production.

Paul E. Peacock, Jr., resigned as vice-president and chief engineer of H. EMERSON THOMAS & ASSOCIATES, INC., Westfield N. J. **Arthur E. Wastie** replaces Mr. Peacock in the corporation.

Seymour Preston appointed sales representative for ALEXANDER SAUNDERS & CO., New York.

John R. Fennie, appointed manager of the tubular products department of JOSEPH T. RYERSON & SON, INC., Los Angeles.

Gordon F. Colson, named field engineer for the abrasive division of NORTON CO. Mr. Colson will be located in the Chicago area.

F. T. Swain, named personnel director of HARNISCHFEGER CORP., Milwaukee.

Stanley E. Bovim, named manager of a new branch office of ALLIS-CHALMERS MFG. CO., in Peoria, Ill. **F. D. McGuire, Jr.,** has been transferred from the Chicago district office to the new Peoria branch as sales representative.

Henry Barnhart, appointed general manager of the Lima, Ohio plant and **J. F. Connaughton** as assistant general manager there for the BALDWIN-LIMA-HAMILTON CORP.

Melvin E. Kramer, appointed manager, Cleveland plant, Reliance Steel Division, of the DETROIT STEEL CORP. **Selvin Hoffman** will be in charge of the order-service department.

Eleanor E. Perks, appointed advertising manager of PENNSYLVANIA FLEXIBLE METALLIC TUBING CO., Philadelphia.

Everett A. Utecht, appointed chief engineer, DAVEY COMPRESSOR CO., Kent, Ohio. Mr. Utecht has been a member of the engineering staff for the past 5 years.

L. E. Loshbough, elevated to the presidency of the FEDERAL PRESS CO., Elkhart, Ind. Mr. Loshbough succeeds his father **J. E. Loshbough,** founder of the business, who now becomes vice-president and secretary of the company.

Daniel F. Magner, joined the staff of the machinery division, DRAVO CORP., Pittsburgh. Mr. Magner will be stationed in Washington, D. C.

OBITUARIES

William Watson, Sr., 82, former vice-president in charge of manufacturing at Allis-Chalmers Mfg. Co., died at his home in Milwaukee recently.

Charles E. Hanssen, 85, president of Louis Hanssen's Sons, died at Davenport, Iowa, recently.

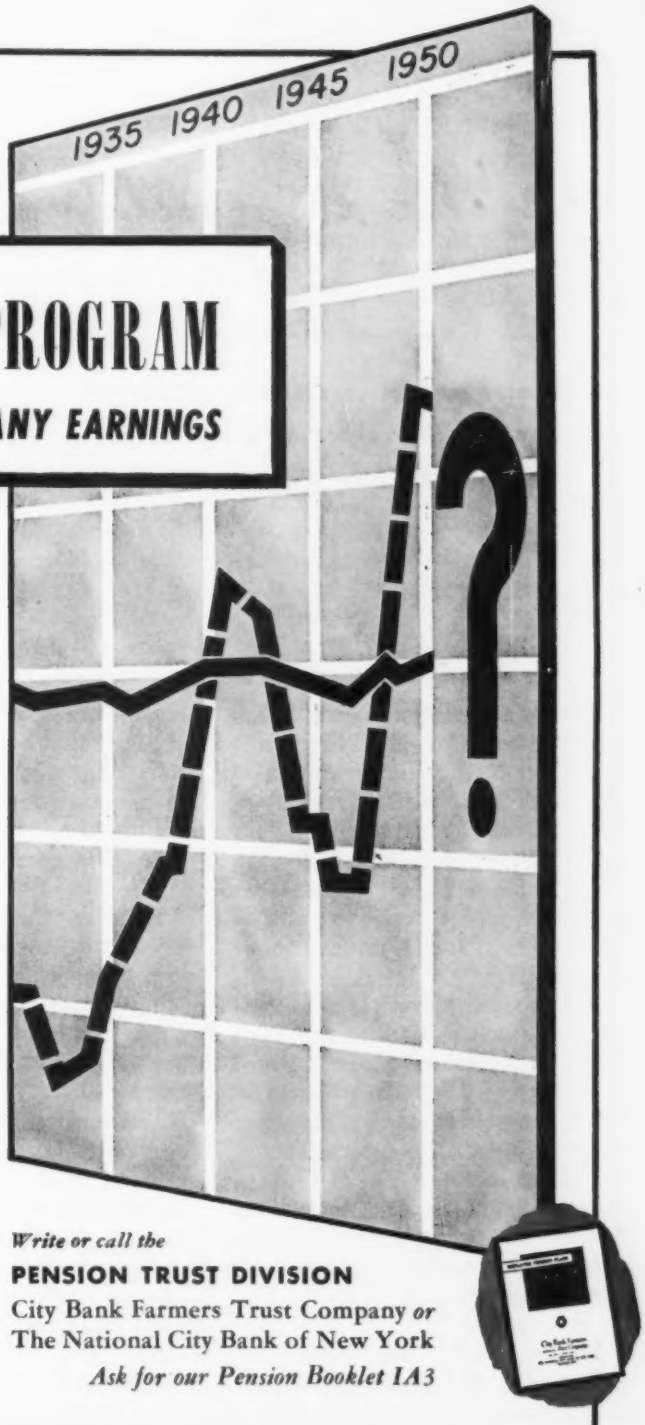
Joseph E. Fields, a director of Chrysler Corp., died in Palm Springs, Calif., at the age of 72.

George Meder, 53, a sales representative of the Minneapolis-Honeywell Regulator Co., died in Queens Village, Queens, recently. Mr. Meder had been in the employ of the company for the past 19 years.

Patterns in Pensions

YOUR RETIREMENT PROGRAM

SHOULD BE GEARED TO YOUR COMPANY EARNINGS



IF your company
EARNINGS ARE STEADY

Your company probably can afford the permanent commitment of an adequate pension system.

IF your company
EARNINGS ARE ERRATIC

Your company probably can best solve the retirement problem through a deferred profit-sharing trust—or a combination of a modest fixed pension commitment plus a profit-sharing retirement plan.

FIND OUT what plan
BEST fits your business

Let us help you with complete analyses, including cost estimates. There is no obligation, of course.

Write or call the
PENSION TRUST DIVISION
City Bank Farmers Trust Company *or*
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on the assembly line

automotive news and opinions

Dealer new car stocks down . . . Output threat of bar shortage increases . . . Nodular cast iron research continues.

by Walter G. Patton

New Car Stocks Down—This year will be an exception to the rule that automobile manufacturers usually start April with a large stock of new cars. Compared with a year ago, new cars in dealers' hands are down 10 pct to 15 pct. Some manufacturers report their inventories have been reduced several thousand units.

The used car picture is not as unfavorable as it was a year ago, however. Most dealers' stocks of used cars are up. In some instances, stocks have been swelled by dealers who bought up used cars, anticipating a sharp rise in prices. Price ceilings, of course, have nullified this strategy. At present, most used cars are *not* selling at the ceiling price.

Buyers Now Hunt Bars—The threat of a bar steel shortage increases daily. Now it is only a question of whether auto schedules will have to be cut during April or May because of inability to obtain forging bars. Buyers of auto steel who once concentrated on flat-rolled steel are now hunting forging bars. Some conversion deals for bars have been reported but the opportunities for conversion here are strictly limited.

Particularly hard hit are manufacturers of special machine tools. A prominent Detroit firm reported last week that bar stocks in Detroit warehouses were practically exhausted. A search of Detroit and New York steel warehouses failed to turn up a few bars of alloy steel required to complete a machine that was badly needed for defense.

Nodular Cast Iron — Experiments with nodular cast iron, limited thus far, are nevertheless going forward. One large auto producer has conducted extensive experiments with nodular iron. The results of investigations have not been announced but are believed to be favorable. Most likely application for nodular iron in an automobile today is the crankshaft. Some metallurgists believe an automobile crankshaft made of nodular iron and produced by the Croning Shell Mold process may ultimately replace many forged or cast steel crankshafts.

Lowers Machining Costs—An important advantage of nodular cast iron is ability to reduce machining costs. A major producer of hydraulic presses has reported the use of nodular cast iron instead of cast steel has resulted in an overall saving of 25 pct in the production cost of a big press. Largest saving is the reduced cost of machining.

Less Nickel for Plating—Commencing Apr. 1, rigid restrictions on the use of nickel for plating of nonfunctional automotive parts becomes effective. The order was originally scheduled to go into operation Mar. 1. Recently, a number of items were added to the restricted list.

Permitted applications for exterior plating include bumpers, bumper guards, door hardware and hub caps. Car manufacturers who had stocks of nickel on hand are permitted to use their inventory to plate restricted parts—if they choose to do so.

TV Help-Wanted Column—Manpower has already become a scarce item in Detroit and several prominent firms here are using television to attract skilled help. In an evening TV program titled, "Help Wanted," nine Detroit employers last week told attractive stories about good jobs available for workers.

Included among the users of Detroit TV are Richard Bros. Div., Allied Products Corp.; Micromatic Hone Corp.; Continental Motors; a General Motors Div. and several small engineering firms.

Billions and Billions—The Big Three automotive producers already have $5 billion in defense contracts. GM has announced contracts aggregating more than $3 billion. Both Chrysler and Ford have now passed the billion mark.

assembly line

Continued

The Kaiser-Frazer and Packard contracts add another billion dollars. To this should be added large defense contracts held by Hudson, Studebaker and Willys. Up to the present time, Nash has made no announcement about defense contracts. It is known, however, that negotiations, probably involving a considerable sum, are in progress.

From Land to Air—Seven auto firms have already signed contracts to build aircraft engines. These include Buick, Chevrolet, Chrysler, Ford, Hudson, Kaiser-Frazer and Packard. Studebaker is currently negotiating for a jet engine contract.

One of the interesting aspects of the defense programs announced to date is their tendency to grow. As originally announced, the Ford contract to build Pratt & Whitney engines at Chicago was valued at $35 million. The new valuation is $565 million, not including $82 million being spent for tools and $17 million appropriated to rehabilitate the plant.

A Half to Defense—Defense contracts in Detroit tool and die shops have been snow-balling during the past month to 6 weeks. Some shops working on jigs and fixtures are booked a year ahead on defense work. It has been estimated that more than 50 pct of Detroit's tool and die capacity is now being used on tooling for government contracts.

The tool shop labor situation is critical. Pirating has been going on quietly for months. The labor situation is expected to become critical before summer. To complicate the picture, large numbers of skilled workers are leaving to set up their own shops. On many occasions they take key workers from their employer's plant with them.

While the Cat's Away—Walter Reuther will go to the Cleveland convention of UAW-CIO Apr. 1 without any really challenging opposition. There have been, as usual, criticisms of the Reuther administration. A recent proposal to increase dues has been vigorously attacked. However, opposition to Reuther is unorganized and weak.

Labor observers in Detroit are predicting that shortly after Apr. 1, Reuther will take a top Washington post, possibly next to C. E. Wilson. He will retain the presidency of the UAW if he goes to Washington. Naturally, he will not be able to devote the same effort to the UAW job. This will undoubtedly be an opportunity his enemies have been waiting for. They can be depended on to take full advantage of his absence—if he goes. Some point out that Reuther's keeping his union position while he serves the government is contrary to the generally accepted practice in industry.

Interchangeable Parts—Standardization has an important place in the defense program. For example, Continental Motors has designed an engine for military vehicles using standardized parts. The engines can be built up as units. Cylinders and main components are interchangeable.

Available information indicates further that tank production methods will also be highly standardized. The Cadillac tank plant at Cleveland is taking the lead in this project.

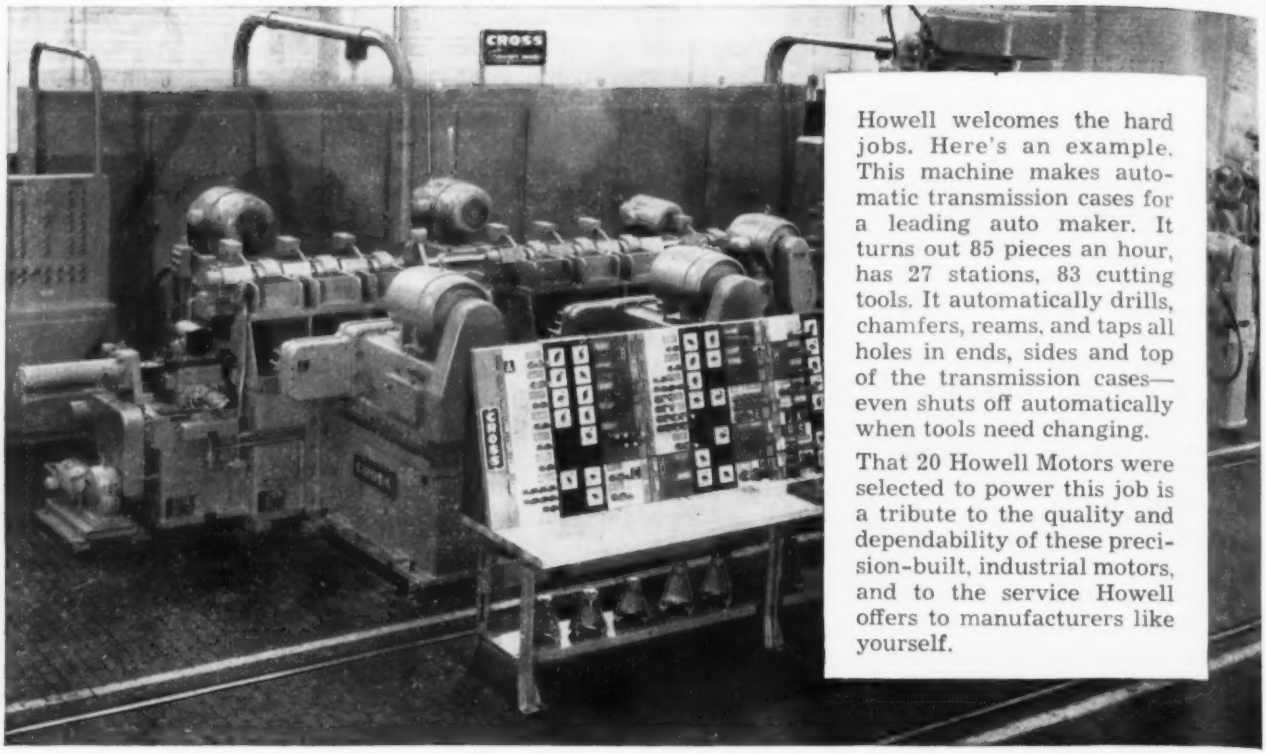
Chrysler, Ford and Fisher tank operations will undoubtedly be closely patterned after the Cleveland setup. As far as possible, it is believed that tooling and materials handling techniques will be duplicated in each of the new tank plants. Machines will be largely standard rather than special purpose.

New Ford Location—No official announcement has been made but it is anticipated that the new Ford tank plant will be located west of Detroit, probably south of Plymouth Road, in the Southfield-Inkster district. Available information indicates a plant as large as 1,600,000 sq ft may be built.

While Ford has not yet received a jet engine contract, there is speculation that the Lincoln-Mercury assembly plant located west of Wayne, Mich., will be used to build jet engines. There is a strong probability the Ford tank plant will be used for the production of Ford tractors after the crisis.

THE BULL OF THE WOODS — **By J. R. Williams**

I FEEL AN ALL-AROUND MACHINIST SHOULD GET MORE THAN ONE WHO AIN'T--LOTS MORE! A TOP HAND WHO ALWAYS HAS TO COME TO TH' RESCUE, AN' DON'T GET ANY MORE--IT MAKES ME SICK--IT--IT'S--
I GUESS IT AIN'T A PLEASANT JOB, YANKIN' SOME POOR LUG OFF A BIG SNAP ONTO A ROTTEN RUSH JOB!
IT'S A DEAD GIVE-AWAY, TOO--HE'S DOIN' ALL TH' LOUD-MOUTHIN' FOR OLD DINNY, AN' SHOWS WHAT HE USED TO THINK HIMSELF--BUT DOESN'T DO ANY-THING ABOUT NOW!
3-30
J.R.WILLIAMS
THE OLD WAR HORSE
T. M. REG. U. S. PAT. OFF.
COPR. 1951 BY NEA SERVICE, INC.

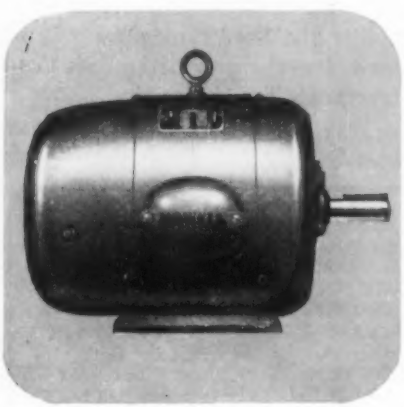


Howell welcomes the hard jobs. Here's an example. This machine makes automatic transmission cases for a leading auto maker. It turns out 85 pieces an hour, has 27 stations, 83 cutting tools. It automatically drills, chamfers, reams, and taps all holes in ends, sides and top of the transmission cases—even shuts off automatically when tools need changing.

That 20 Howell Motors were selected to power this job is a tribute to the quality and dependability of these precision-built, industrial motors, and to the service Howell offers to manufacturers like yourself.

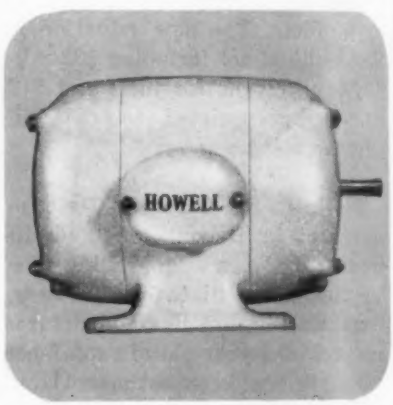
Solution for . . .

THE CASE OF AN AUTOMATIC TRANSMISSION



Howell Type K Motor. Offers constant performance in the presence of dirt, dust, fumes, and moisture. Sizes from 3 to 150 H.P. at 1800 R.P.M. Either vertical or horizontal mounting.

Howell makes specially designed motors—vertical, round body, flange and face mounting, built-in stator and rotor jobs, etc.—to meet a wide range of requirements.



Howell Sanitary Motors meet the most exacting standards of the dairy and food industries. They contain no pockets, cracks, or crevices. Available for vertical or horizontal mounting.

Read this if you need special motors

Howell offers a unique job-engineering service for special motor applications.

With it, you get: (1) cooperation of our engineering personnel; (2) prompt quotations on both standard and custom motors; and (3) the ability to accurately manufacture custom-designed motors within reasonable time.

We believe these services will save you, as a purchaser of electric motors, valuable time and money.

May we apply our facilities and engineering ability to your problem?

HOWELL MOTORS

HOWELL ELECTRIC MOTORS CO., HOWELL, MICH.

Precision-built Industrial Motors Since 1915

HOWELL Red Band MOTORS

west coast progress report

digest of far west industrial activity

by R.T.Reinhardt

Defense Lag—The impact of defense orders on West Coast steel mills has not been as heavy as it is in the East and Midwest. So far only two important prime contracts involving steel have been awarded to West Coast companies. And it will be 6 months before these orders—for military type vehicles—are likely to be in production. Even so, requirements will be light contrasted with what would be needed if shipbuilding really got under way here.

Unconfirmed by Kaiser-Frazer officials is the report the company is no longer planning on using the government-owned shipyard at Vancouver, Wash., for production of tanks although it has government permission. Prospects are this work may be done at Richmond, Calif., 700 miles closer to Kaiser's Fontana plant.

Imported Steel—Lack of major defense steel business doesn't mean steel is easy. Line pipe demand alone is enough to keep pressure at a peak on plate. Standard pipe supply is well below demand and some distributors are importing standard pipe from France and Belgium.

Would-be importers of sheets and plate report their letters of credit are often manipulated to expire before shipment is made. The steel is then sold at higher prices in the East.

Nip and Tuck—Gathering scrap to keep western mills running at above rated capacity is increasingly difficult. This section, once a scrap-plus area, is looking for imports to hold up its supply of metallics. Steel executives are eyeing fleets of hundreds of laid-up Liberty ships.

At the current rate of shipbuilding these floating junk heaps are not likely to see the scrapper's torch for a long time but return of Korean battlefield scrap is a more promising prospect. Some sources estimate there are about 300,000 tons of battle and rubble scrap in Korea.

Relax on Moly?—Officials of the U. S. Bureau of Mines want steel people to consider relaxing current restrictions on domestic tungsten. A Bureau official here last week pointed out that the U. S. has some tungsten deposits that contain molybdenum.

Since the two go into many steels he suggested that the industry consider relaxing the requirement that molybdenum be virtually removed before the ore can be sold under current commercial practice.

Manganese Prospects Improve—Low-grade manganese deposits in the West, tapped during the last war, are again becoming important. Development of deposits in southern Utah and Nevada is expected to be stimulated by a tenfold expansion of Western Electro Chemical Co. manganese dioxide plant at Henderson, Nev. The Army has approved an expenditure of $850,000 for that purpose. The plant now handles about 60 tons of ore daily.

In California, which contributed minor quantities of manganese during the last war, there is an increased interest in devising and improving methods of recovery from low-grade ores in which the manganese is so closely associated with impurities conventional methods of recovery are impractical. Mine owners are looking for help in developing new techniques.

Ask for Tourniquet—Western foundries are attempting to stop the bleeding of scrap from this area into distant markets. In Los Angeles, foundrymen have appealed to the Office of Price Stabilization, urging a ceiling be put on the amount of freight which can be paid above cast ceilings.

Fighting for scrap to keep their cupolas operating, these foundrymen have suggested a $7 figure above ceiling price as being the permissible limit to be allowed for freight. Midwest cast grade purchasers have been raiding Pacific Coast supplies by paying the entire freight.

300 / hr.

a new high with two-at-a-time flamatic hardening

Simply place **two** 18" ring gears on the Cincinnati Flamatic hardening machine, push a button, and in less than half a minute they're hardened to a specified surface hardness, pattern and gradient. Distortion (usually a headache on thin sections) is so low that straightening is virtually eliminated. Big reasons for uniformity of results are rapid heating with high temperature flames plus Flamatic's electronic control which holds surface temperature of each part within ± 10°F . . . **Flamatic** versatility accommodates gears, cams, rollers, parts with multiple diameters, etc., up to 24" OD depending on width, and spindles up to 24" long depending on OD . . . **Flamatic** automatic operation conserves vital skills . . . Send for the new illustrated catalog which includes twelve application case histories. Just ask for publication M-1724.

The Cincinnati Flamatic Hardening Machine handles ring gears from 7½" to 24" OD.

flamatic

THE CINCINNATI MILLING MACHINE

Cincinnati 9, Ohio, U.S.A. •

the federal view

this week in washington

by Eugene J. Hardy

Tax Amortization Headaches—The political chickens in the fast amortization picture are coming home to roost. C. E. Wilson, Defense Mobilization Director, has already ordered a halt to the willy-nilly granting of certificates of necessity.

In the beginning, political considerations governed the issuance of many certificates for plants of doubtful economics. Some officials in NPA and other agencies charged with analyzing the applications wanted to make sure that adequate supplies of raw materials were available for the contemplated expansion and to throw out doubtful cases. NSRB officials—who originally had the final say and still do but now as part of the Defense Production Administration—didn't know much about the industries asking for certificates and issued at a rate which amounted to an avalanche.

NPA Has Bigger Voice—Now, cooler heads have taken over and NPA's commodity divisions will have more to say about future certificates. The steel division is already casting a dubious eye on many pending steel applications. Already some 16 million tons of additional capacity have been certified as eligible for fast tax write-offs.

NPA reasoning runs something like this: Scrap and ore are already looming as critical scarcities, therefore, will there be sufficient raw materials to operate capacity already approved without even considering further expansion? Also, can taking the steel needed for plant construction out of current short supplies be justified for dubious projects? The data now in the hands of NPA gives a definite "No" answer to both these questions.

Restrain the Dubious—So the freeze on issuance of certificates will hold back some of the doubtful projects, but it will also delay expansion plans of highly reputable firms, of which Inland Steel is a prime example. The responsible agencies admit that applications that are economically sound will be approved, but everything will be thoroughly studied.

Congress Up in Arms—But if Mr. Harrison is distressed, Congress is just a little more so.

The Senate-House "watchdog" committee charged with keeping an eye on administration of the Defense Production Act of 1950 believes the time has come to "put the brakes" on issuance of the certificates of necessity which authorize 5-year tax write-offs.

Sees New Legislation — Sen. Maybank, D., S. C., chairman of the "watchdog" committee, voices his concern over the effectiveness of the entire federal tax structure if the certificates of necessity are to be issued to "railroads and other corporations not vitally concerned in the war effort."

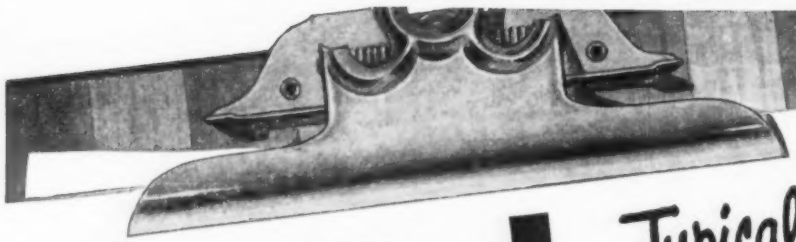
Congressional thinking now indicates that new legislation dealing with the tax write-off certificates will be drafted if DPA does not give further evidence of its willingness to slow down approvals.

Tungsten Price Hit—Opposition to an OPS-proposed price ceiling on tungsten of $55 per unit of 20 lb has been raised by Sen. McCarran, D., Nev.

The arbitrary price of $55 is "based on some theoretical conception of economy developed by a hare-brained government economist who knows nothing of the practical problems confronting the mining industry," he charged.

Lowest price at which domestic producers can successfully mine and market their product is $65-$70 per unit, Sen. McCarran stated, pointing out that domestic production has been curtailed for several months because there has been no definite guaranteed price that could be used as a guide by producers.

Foreign Aid to Rise—Foreign aid, which last year had dropped below the $5 billion rate for the first time since the end of the war, is due to show a sharp increase. The White House is urging Congress to make another $10 billion available for the purpose. This is in addition to the $11 billion left over as of Jan. 1.



INLAND DATA for STEEL USERS

INLAND STEEL CO.

38 S. Dearborn Street, Chicago 3, Illinois

Typical mill tests for quality control of your steels

An important aspect of steel manufacturing is that, in the great majority of cases, steel is "tailor-made" to meet a specification or to make a particular part. It is therefore necessary for the steelmaker to know as much about each heat of steel as can be efficiently obtained. The tests described below are the main tests run by the steel producer to check the quality of the steel against the specified requirements. Naturally these tests do not stand alone as the final quality determinants. The steelmaker uses many other tests and his metallurgical experience as well as his knowledge of the steel fabricating processes to assure the customer of the right steel for the job.

1

2

BEND TEST

Bend tests are employed to determine the ability of steel to withstand cracking during subsequent forming operations at the customer's plant. Basically, the test consists of bending test pieces through certain specified arcs. (photos 1 and 2). The amount of bending a piece of steel will withstand depends on its chemical composition, its tensile strength, its thickness, and its grain structure.

3

HARDNESS TEST

Abrasion, indentation, wear, cutting and shearing . . . all these are related to the hardness factor of the steel. Hardness tests are most often made after the steel has been heat-treated or just before it is to be temper rolled. Hardness is measured by Rockwell or Brinell testing machines (photo 3) which indent the surface of the specimen with a predetermined load. The relationship of the load and depth of indentation is then translated into a hardness reading.

CUPPING TEST

Clues to a steel's suitability for future drawing operations are uncovered by the cupping test. In this test, a sample piece of steel is placed in a special machine in which a smooth metal ball is forced against the flat surface of the specimen thus drawing it into the form of a cup and continuing the distortion until the material is fractured (photos 4 and 5).

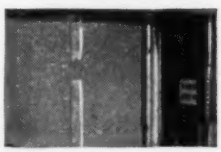
4

5

TENSION TEST

In applications where the steel will be under stress, either static or dynamic, the steel mill quality control department is interested in determining certain mechanical properties of the steel . . . tensile strength, yield point and the amount of elongation in a specimen of a certain length. Specimens of the various products are pulled asunder until fractured by hydraulic or mechanical testing machines which accurately measure the applied load (photos 6 and 7).

6

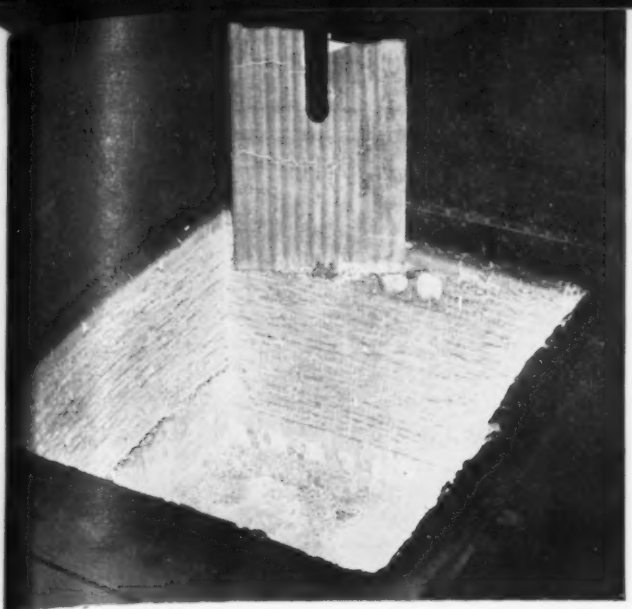


7

CHEMICAL DETERMINATION

The most widely used tests for quality control of steel at the mill, are the tests which determine chemical compositions of the raw materials and the finished products. It is estimated that Inland runs 1,250,000 chemical determinations each year. In addition to the wet chemical tests, the spectrographic method (photo 8) is widely employed for making quick, accurate determinations.

8



THE IRON AGE
FOUNDED 1855
FEATURE ARTICLES

NEW INGOT MOLD COATINGS are in use

Four substitutes for tar coatings of ingot molds have been thoroughly tested. Darmold and Hydropaste have not been satisfactory but Darmold AE has been tentatively adopted at Gary Steel Works. New types of applicators have been developed for the newer coatings.

By J. J. GOLDEN
Asst. to Vice President, Steel Production, United States Steel Co., Pittsburgh

FROM the standpoint of steel quality and ingot-mold life for certain steel specifications it is generally conceded that coated molds are superior to uncoated molds. For many years by-product tar has been in use as a mold-coating agent at Gary Steel Works and many other steel plants. The results with tar have been satisfactory in steel quality, mold life and cost, but the heavy fumes given off during the coating or dipping operations and during the pouring of steel in tar-coated or tar-dipped molds are considered to be undesirable.

Gary Steel Works is now studying the relative merits of materials other than tar, with a view to obtaining a mold-coating which does not give off fumes and yet approaches tar in performance and cost. The materials being studied are Darmold, Darmold AE, Mexican Graphite, Hydropaste, and many others.

Darmold is a colloidal graphite suspension resembling heavy black paint. When applied to molds, it leaves a rather light-appearing, dull gray coating, quite unlike tar in appearance. Hydropaste is a non-inflammable paste consisting of flake aluminum and a binder. It resembles a cold-water paint in character and consistency when mixed with water.

450 F Max Coating Temperature

A mold temperature between 200 and 400°F is desirable for applying either of these two materials. Both are superior to tar for coating cold molds. With temperatures above 450°F, however neither material appears to adhere in suffi-

TABLE I

QUALITY PERFORMANCE—RAIL STEEL

Coating Material	No. Rails Inspected	Ratio of Defective Rails
Production Run "A"		
Darmold	13,649	1.110
Tar	6,833	1.000
Hydropaste	5,090	1.18?
Tar	6,857	1.000
Production Run "B"		
Darmold	13,649	1.110
Graphite	866	1.000
Tar	6,833	1.000

TABLE II

QUALITY PERFORMANCE—BY PRODUCT

Product	Coating Material	Ingot Tons	Ratio of Surface Rejections
Slab	Darmold	13,466	0.950
	Tar	9,978	1.000
Billet	Darmold	23,488	0.835
	Tar	11,974	1.000
Total	Darmold	36,934	0.865
	Tar	21,952	1.000

New mold coatings (Continued)

cient quantities, and non-uniform coating may be obtained.

Initial service trials with both Darmold and Hydropaste indicated that neither is suitable for application with out present-type applicator, which was developed for tar, since these materials differ from tar in consistency and viscosity. The Gary applicator, used for a number of years, is a portable, electrically driven, spinner-type tar sprayer shown in Figs 1 and 2. Its spinner unit is equipped with spiral vanes driven at 575 rpm by a vertical-shaft electric motor. Tar or other coating flows to the spinner unit when a needle valve, controlled by solenoid, is open. This arrangement functions automatically and permits tar to flow to the spinner unit only while the sprayer is being lifted inside the mold by the crane. Molds coated with Darmold or Hydropaste, using the spinner-type sprayer, were unsatisfactory in that a streaky, beady, non-uniform coating resulted and excessive material was used.

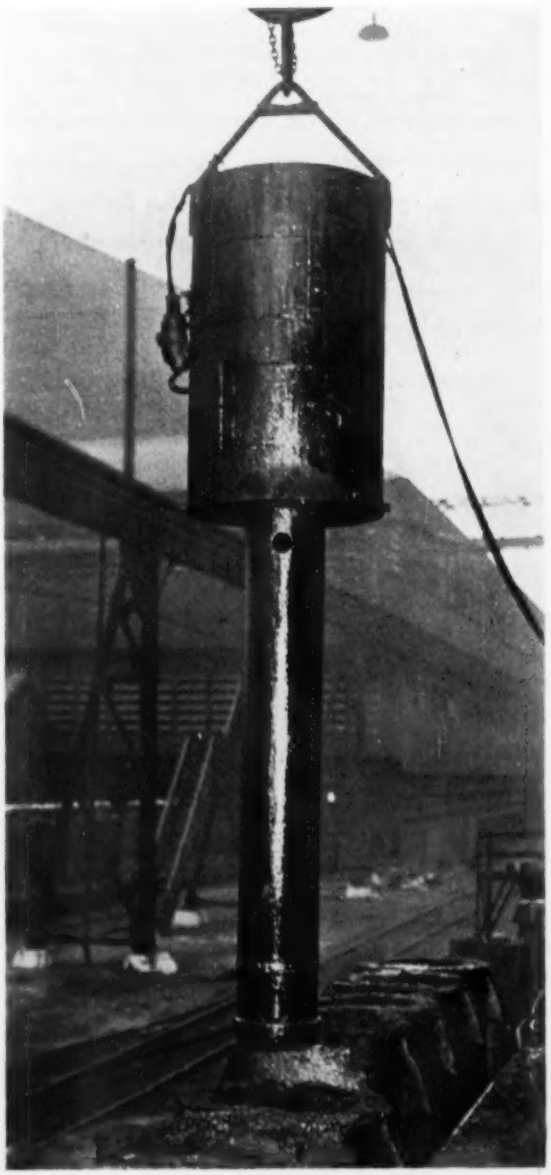
New Equipment Necessary

In view of the higher cost of Darmold and Hydropaste over tar, it was evident that new equipment was necessary, to apply the thinnest possible uniform coating consistent with acceptable quality performance. To fill this need, a compressed air applicator, Fig. 3, was developed which currently coats about twice as many molds with the same amount of material as the spinner spray. This apparatus is essentially the same in appearance and operation as the spinner spray but has a stationary nozzle in place of the spinner unit. The material is atomized by compressed air, whereas the spinner forces out the material by centrifugal action.

Mexican Graphite was the next material tried. It was mixed in the proportion of 2 lb of dry powder to a gallon of water in accordance with the supplier's recommendations. The mixture was first applied with the spinner-type tar sprayer. Results from this procedure were unsatisfactory and similar to those experienced with Darmold and Hydropaste. Later trials were confined to the compressed-air sprayer. This apparatus was efficient in applying an acceptable coating, providing constant agitation of the mixture was supplied to maintain the graphite in suspension.

Graphite-water mixtures have some advantage over either tar or Darmold in that a good coating may be obtained over a wide range of mold temperatures, whereas tar is unsatisfactory for cold molds and Darmold tends to burn off partially on hot molds. Fumes produced during the

FIG. 1—This is the spinner type tar sprayer used at the Gary Steel Works for a number of years.



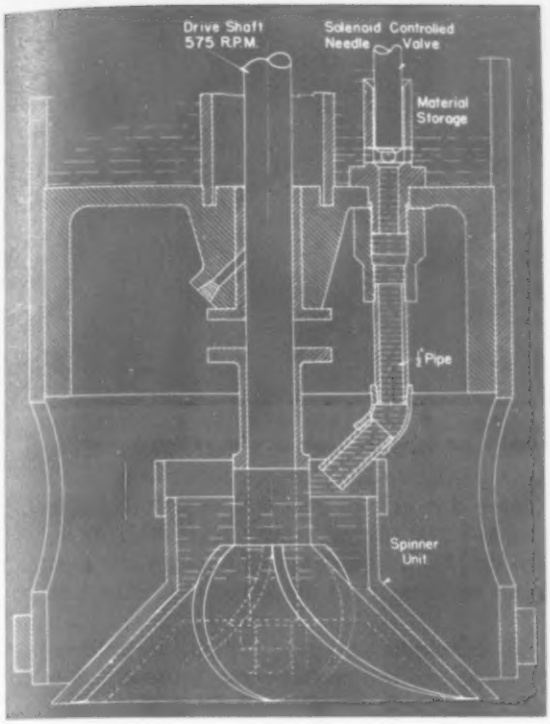


FIG. 2—Cross-sectional view of a spinner type sprayer.

coating of molds with graphite do not present a problem since the only volatile matter in the graphite mixture is the contained water.

Table I shows data obtained from two separate production runs of rail steel. For each run two new sets of molds were put in service and each set used exclusively for one type of mold coating. It will be noted that surface quality performance from both Darmold and Hydropaste was somewhat inferior to that of tar. Table 2 contrasts surface performance on rail steel from Darmold, graphite and tar.

The data in Tables II and III show surface-quality performance for billet and slab product. In Table II the data have been arranged to show quality performance of Darmold and tar by type of product. Table III compares the performance of Darmold, graphite, and tar by type of steel.

The manufacturers of Darmold have offered a new type material for trial. This material was purchased under the trade name of Darmold AE. A small-scale trial of Darmold AE indicated relatively minor, unobjectionable fumes during the coating operation. In addition, a radical change had been made in the viscosity and cohesive properties, which permitted use in the spinner-type tar sprayer. A comparison of the viscosity of regular Darmold and Darmold AE is shown in Table IV.

After applying a full tank car of Darmold AE with the spinner tar sprayer, it was evident that up to 40 pct water could be added and still obtain a satisfactory mold coating. Maximum water dilution with the regular Darmold had been 20 pct.

Gary Steel Works has discontinued the use of tar for coating molds and is currently using Darmold AE applied with the spinner-type tar sprayer. The most important consideration which exerted a considerable influence in the choice of a substitute material for tar follows:

Neither Hydropaste nor Mexican Graphite can be applied with our spinner-type sprayer. Both these materials tend to settle out of suspension and require, in addition to special equipment for initial mixing with water, constant agitation up to and during the mold-coating operation. On the other hand, Darmold AE is readily adaptable to present equipment. Converting from tar to Darmold did not involve any changes in equipment, method of application, or additional manpower.

Although Gary Steel Works is currently using Darmold AE for coating molds, this choice is by no means the final answer to the problem.

TABLE III

QUALITY PERFORMANCE—BY STEEL TYPE

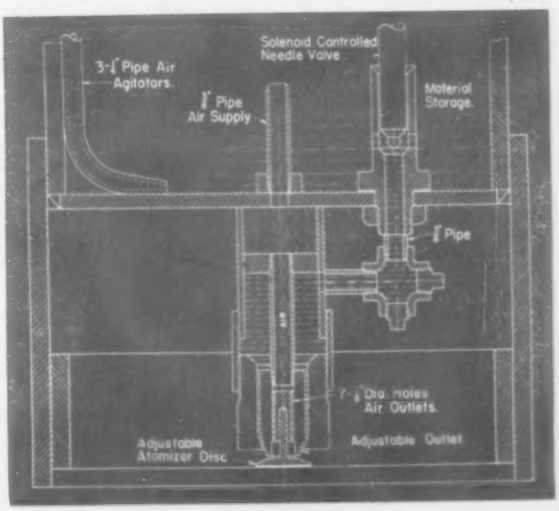
Grade	Coating Material	Ingot Tons	Ratio of Surface Rejections
Rimmed	Darmold	18,117	1.350
	Graphite	857	0.782
	Tar	12,377	1.000
Semi-Killed Under 0.30 pct C	Darmold	15,689	0.359
	Graphite	1,925	0.953
	Tar	8,113	1.000
Killed—Steel Over 0.30 pct C	Darmold	3,128	0.868
	Graphite	810	5.080
	Tar	1,482	1.000
Total	Darmold	36,934	0.865
	Graphite	3,692	1.095
	Tar	21,952	1.000

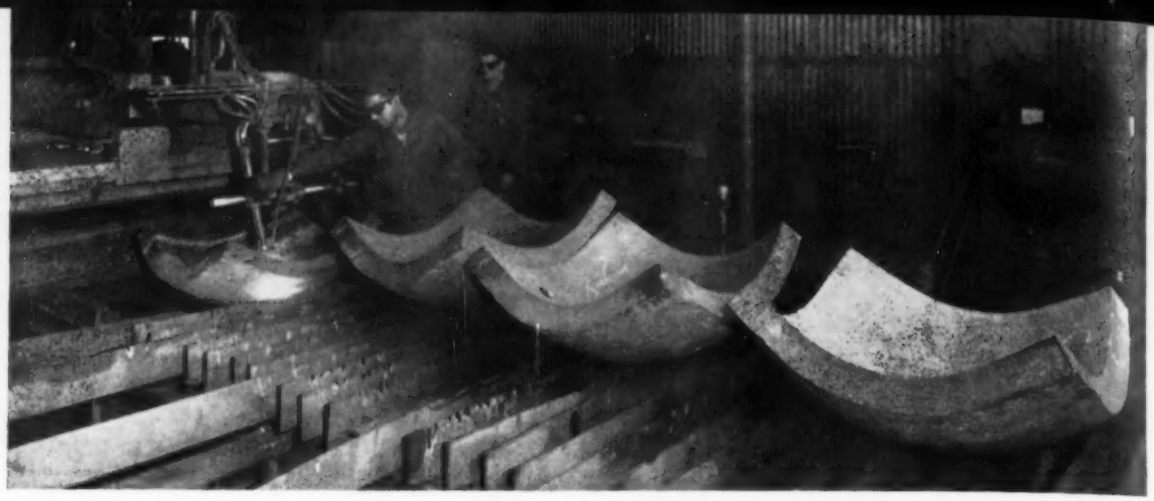
TABLE IV

DARMOLD VISCOSITIES

	Regular Darmold	Darmold AE
100°F	1900	9900
150°F	900	2650

FIG. 3—Cross-sectional view of newly developed compressed air sprayer.





AFTER FORMING the 3.687-in. thick stainless type 347 plate is machine cut using the Linde powder cutting process.

welded spheres

SOLVE LIQUID NITROGEN STORAGE

Tanks to store liquid nitrogen used for rocket propellants must meet 15 ft-lb Charpy impacts at —300°F. Through special design and welding practice, spherical tanks holding 200 gal and capable of 5500 psi service have been built.

Requirements for gaseous nitrogen as a source of energy to expel the propellants and oxidizers from the fuel tank of supersonic aircraft have existed since the selection of Edwards Air Force Base as the proving grounds for the Bell X-1 research plane on Dec. 22, 1947.

The fuel and oxidizer combination may vary according to the manufacturer's specifications set up by the aircraft manufacturer. One common problem has been prevalent with aircraft undergoing tests, namely, the requirement for high pressure gaseous nitrogen at extremely high pressure (6500 psi) in large volume. Requirements for gaseous nitrogen at 6500 psi preclude the possibility of meeting the demand with commercially obtainable service. Rated capacity of commercial carriers for this gas is limited to 2200 psi by the Interstate Commerce Commission.

Liquid nitrogen is fed by gravity feed system from permanent base equipment serviced and leased to Edwards Air Force Base by Linde Air Products Co. to a 200-gal pressure sphere designed and fabricated by Research Welding & Engineering Co. The liquid nitrogen is forced under pressure from the 200-gal sphere into an evaporator or heat exchanger. Gaseous nitrogen is produced at any desired pressure up to about 10,000 psi by controlling the boil-off rate of the liquid.

One of the most complex problems encountered in producing the entire system was the design and fabrication of the 200-gal sphere suitable for 5500 psi service at —320°F.

Selection of ASTM, A 240 grade C steel plate, was made after all tests to certify the material had been completed. Charpy impact values of parent metal and weld metal as well as hot forming characteristics of the plate were all analyzed.

By J. A. TOLAND
Partner, Research Welding & Engineering Co.
South Gate, Calif.

Methods and techniques for arriving at optimum values were also evaluated. Case history on other liquid nitrogen and liquid oxygen vessels fabricated also helped influence the selection of material. Some of these units have been in operation at missile test stations for over 2 years and have given trouble-free service.

All design criteria was formulated in accordance with the ASME Code—paragraph U-200 for unfired pressure vessels. Weld joint efficiency of 95 pct was used for the obvious purpose of reducing weight and thereby effecting economy.

Tank Shape Was Optional

Configuration of the vessel was optional. A spherical design using six segment construction was chosen after an appraisal of available fabricating facilities in the shop and in the outside shops in this area. Plate for the six segment pattern was ordered from the mill in 3½x38x38-in. size with adequate stock for trim after forming.

Forming of the plate was accomplished in a 1200-ton forging press after heating parts to forging temperature. All parts were formed in a die. All six segments received the same spherical radius. Complete cost analysis had been made to determine the advisability of machining the weld bevil vs. the use of the Linde powder cutting process for austenitic stainless steel. The saving to be made using the powder cutting was very attractive. The time saved actually amounted to a very substantial saving.

Layout of all parts to insure proper stock for the weld bevil indicated that the parts were remarkably symmetrical after forming and that the fit-up problem had been minimized by proper preparation and good forming practice. This encouraged the attempt to trim the plates that had been formed to 27 in. spherical radius and produce a weld bevil with one cut on each edge of the four edges of each plate. Selection of a 25° weld bevil was made after evaluation of a number of shop and engineering problems relating to the welding sequence to be used and the efficiency of the joint.

Plate Is Powder Cut

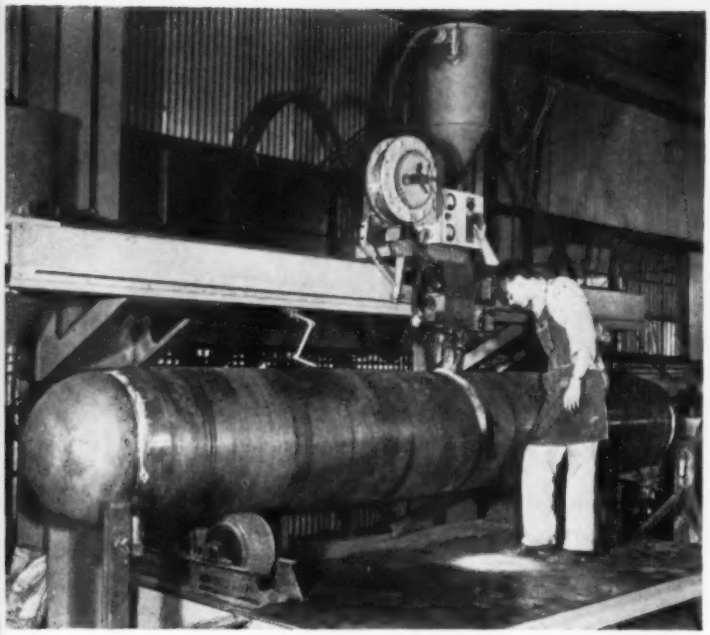
Powder cutting of the 347 stainless steel was accomplished using a layout template for tracing and one cutting head. All flame cut edges were ground to remove any foreign matter produced in the cutting process, as added precaution against contamination from iron pickup. All segments were pickled after grinding.

Fit-up of the six segments were simplified by the use of a 3/16xl-in. backup strip which supported and aligned all the segments until the root weld could be made. The first weld pass was made using heliarc to insure maximum penetration with minimum burn-through of the backup strip. Subsequent weld passes were made with GE type 1347 lime coated electrode.

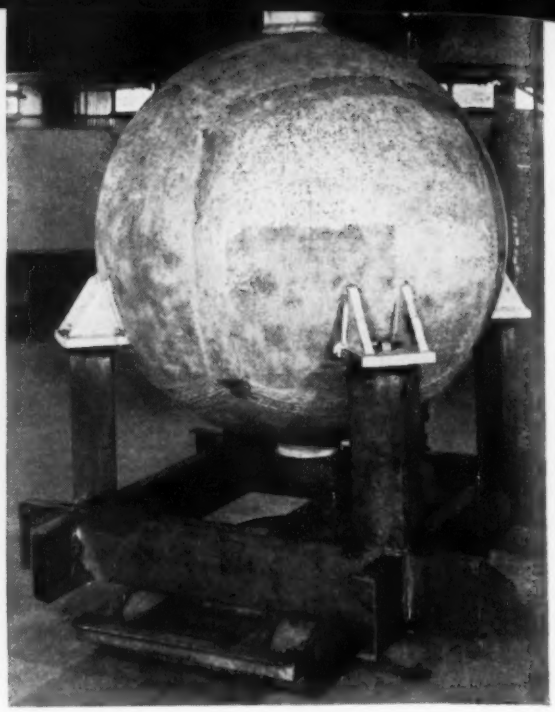
Qualification of the electrode for the job had been established by numerous tests run in the shop for the express purpose of accumulating factual data which the engineering department could use in the selection of the electrode to be used. Governing factors in the consideration of the proper electrode were such important requirements as ASME Code compliance and the ability of the deposited metal to meet Charpy impact test

FIRST WELD PASS is made by Heliarc using a backup strip. GE type 1347 lime coated electrodes are subsequently used.

CHECKING the welds for surface imperfections of a 200-gal liquid nitrogen sphere.



ANOTHER TYPE of liquid nitrogen tank showing the submerged arcwelding of the girth seam. This tank has a capacity of 40 cu ft for a working pressure of 3000 psi.



COMPLETED 54-in. OD sphere. Shell thickness is 3½ in., the sphere is guaranteed for a working pressure of 5590 psi and calculated bursting pressure is 23,000 psi.

Welded spheres (Continued)

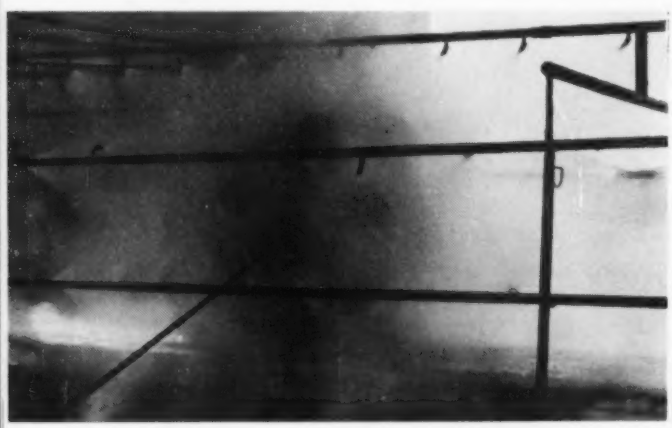
values of 15 ft-lb minimum at the test temperature of —300°F.

Two intermediate X-ray inspections were made on all welds as the work progressed to keep a constant check on our welding procedure and to insure maximum integrity of the welds throughout the entire welding process. Dy-Check inspection was used throughout the fabrication of the tank to detect surface discontinuities such as craters, cracks, improper fusion, etc. This inspection method was found to be particularly practical in supplementing X-ray inspections.

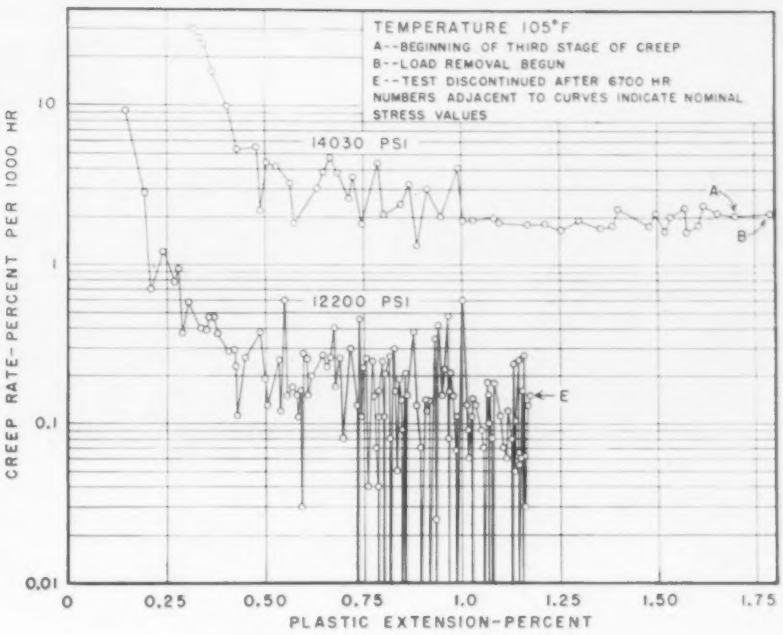
A successful method of quenching after heat treat, using high-pressure water spray, was devised. Complete piping was provided to accommodate enough spray nozzles to allow a discharge of 450 gal of water in less than 3 min. Nozzles were provided for the outside and the inside of the sphere in order to insure an even and rapid quench rate. Heat treating was done in a car-type furnace which had been adjusted to stop in the proper location for quenching. Immediately after heat treating, the vessel was pickled and passivated to remove all scale and foreign matter.

Radiographic inspection of the completed unit after heat treating determined the vessel to be sound and acceptable. ASME Code requires that Charpy test specimens be run on test plates that accompany the vessel to be heat treated. Hydrostatic testing of the vessel could not be considered until after this very important test had been complied with. This test actually determines the acceptability or rejection of: (1) the material, (2) all welding, and (3) heat treatment.

Results of the test were very gratifying as the average of all specimens was 26.6 ft-lb with a low of 21.0 Hydrostatic testing of the vessel at 8950 psi was handled in a routine manner. Successful function of this vessel in the completed nitrogen evaporator system for which it was designed has made it possible to deliver pressure and volume in excess of present requirements.



SETUP USED to quench the stainless steel spheres with a high pressure, 1950°F spray. Reducing the sphere's temperatures to 350°F takes 3 min.

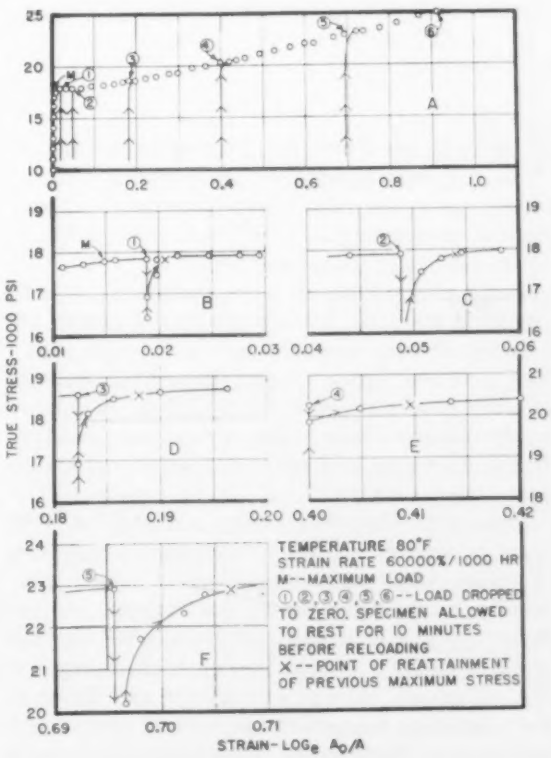


VARIATION OF CREEP rate with plastic extension. Serrated curves are obtained when creep rate is plotted against plastic extension.

Creep of high-purity aluminum plotted

Recent investigations by W. D. Jenkins of the National Bureau of Standards have led to significant fundamental information on high-purity aluminum concerning the effects of stress and sudden changes of temperature on creep behavior. Solid-solution aluminum alloys as well as alloys of the precipitation type make this metal ideally suited as a basis for fundamental studies of the deformation process. The behavior of aluminum alloys at elevated temperatures has been stimulated both by the needs of the aircraft industry and by the availability of aluminum and its alloys in a fairly pure state. The Bureau's study included the standard creep tests made in tension at 105°F under constant load conditions. These results were supplemented by data from interrupted tensile tests at room temperature and from other creep tests in which the test temperature was changed from 105° to 95° and back to 105°F.

The extension-time curves for the constant load tests conformed generally to the well-known patterns associated with creep; an initial extension upon application of load, a stage of decreasing rate of extension, a stage of minimum rate of extension, and a stage of increasing rate eventually leading to complete fracture. However, as was observed in previous investigations of ingot iron and copper at the Bureau, the rate of change of extension with time in these tests also occurred in a discontinuous manner. The frequency and amplitude of the cycles produced are attributed to the magnitude of the stress and the thermal-mechanical history of the material. Discontinuous flow was also revealed at room temperature by serrated stress-strain curves.



TRUE STRESS-STRAIN curves for interrupted tensile tests. Internal stresses, induced by plastic strain, are relieved by removal of load at different strain levels.

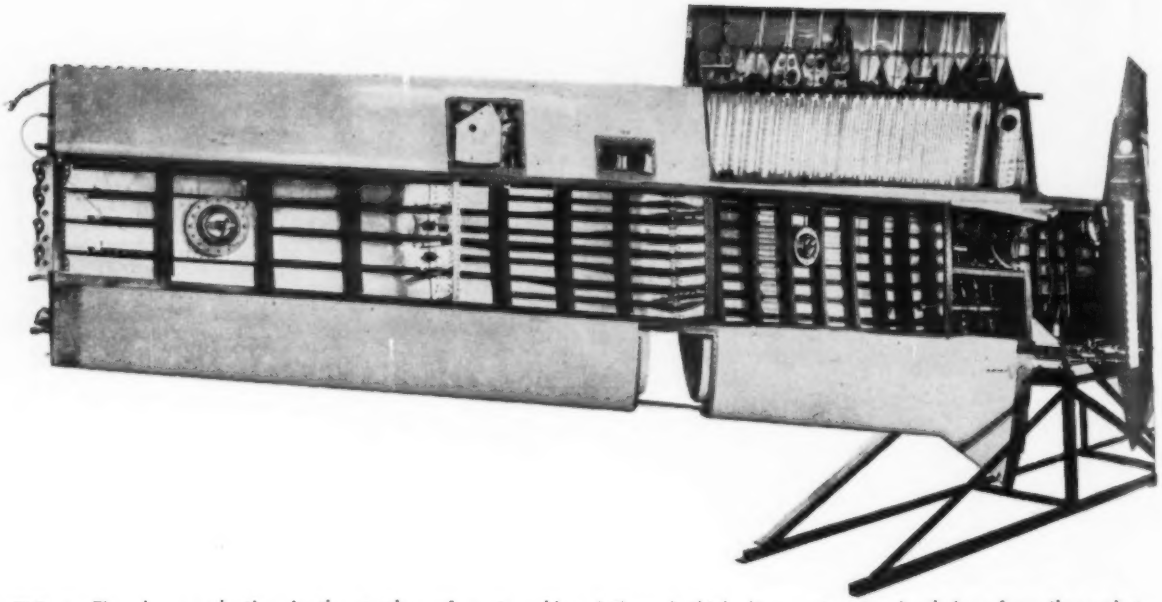


FIG. 1—The sharp reduction in the number of parts achieved through thick skin construction is obvious from these photos. each case the view shows

FIGHTER WING REDESIGNED FOR

Experimental wings of thick magnesium sheet have been made by East Coast Aeronautics and successfully applied to the Lockheed F80C. This construction eliminates many stiffeners, would save manufacturing time and carry 30 pct more fuel.

The U. S. Air Force has been actively engaged in the development of magnesium aircraft structures since 1939. The importance of successful developments in this field to the Air Force cannot be over-emphasized.

Basic magnesium may be classed as a non-strategic material. Although by no means exhausted, the bauxite ores within the continental limits of the United States have been reduced to lower grades which are more difficult and more costly to refine. Magnesium, by contrast, is taken from sea water and therefore exists in an inexhaustible supply.

During the last war, millions of dollars were spent in attempting to use wood for construction of trainer and cargo type aircraft. Very poor results were experienced, particularly in the cargo types, and it was conclusively shown that wood is entirely unsuitable for such emergency use. Through extensive research and development, existing magnesium alloys and design, and fabrication "know-how" have progressed to a state which eliminates the necessity for emergency use of wood.

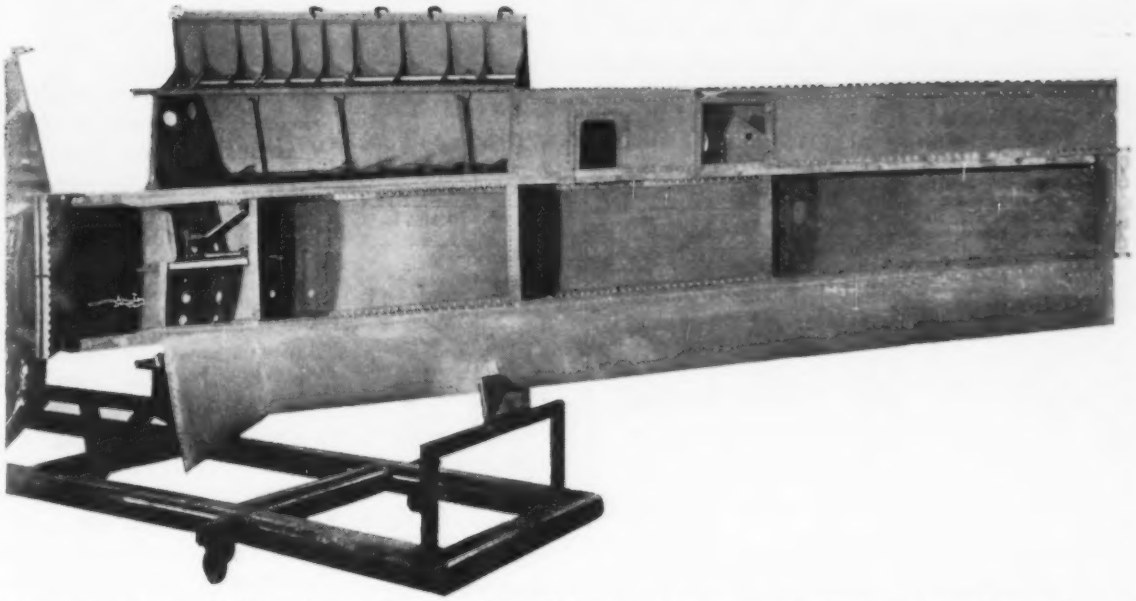
Another basic reason for the efforts being expended is that maximum use must be made of all non-strategic materials which can be proved suitable for use in USAF aircraft structures. In general, the development of magnesium alloy aircraft structures has kept nearly abreast of the development rate of the alloys themselves. Many experimental structures, including wings, fuselage sections and tail surfaces have been designed, fabricated and tested.

First Tested on Trainers

The most successful test program thus far completed involved approximately 10 sets of magnesium alloy wing panels for the T-6 trainer airplane. Some of these panels were flown almost 2000 hr in regular service with excellent results.

The next phase of the development program was directed toward the application of magnesium alloys to high performance, heavily loaded, tactical aircraft structures. The wings described here were made by East Coast Aeronautics, Inc., Mount Vernon, N. Y.

The wing of the Lockheed F-80C jet fighter has been redesigned as a thick skin magnesium alloy structure. The new experimental wing is



The experimental wing (right) contrasts with the standard F80C wing with its maze of stiffening and bracing members. In lower access panels removed

MAGNESIUM

By D. H. BLACK
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Aircraft Laboratory, Engineering Div.
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Wright-Patterson Air Force Base, Dayton

simpler in design; its assembly would be faster and less expensive; and the plane could carry more fuel. On a strength-weight basis the new wing compares favorably with conventional reinforced thin skin construction.

A wing was selected for study because this is one of the most highly stressed major components of a plane. Static tests were successful; four wings are now being flight tested and five more are awaiting installation. The thick skin technique can be applied generally throughout the airframe with some remarkable possibilities. Fig. 1 shows the difference between the thick skin magnesium wing and the conventional heavily braced thin skin wing of the F-80.

Tests conducted over a period of 3 years lead to the following conclusions:

1. *Strategic importance:* Primary aircraft structural components can be satisfactorily fabricated from commercial non-strategic magnesium alloys.

2. *Surface:* Smooth, stable airfoil surfaces can be retained to much higher load factors with thick skin type of design than is possible with the conventional reinforced thin skin type of construction. The experimental wing remained free of buckles up to normal flight load factors 64 pct higher than those for which the F-80C was designed to experience in service.

3. *Design:* The basic structural design of aircraft can be simplified through the use of thick skin type of construction as is illustrated in Fig. 1. Faster production would follow as a direct result of the reduction in number of detail parts and fastenings to approximately 35 pct of those in the conventional wing, and through a drastic reduction in parts requiring expensive fabrication.

4. *Construction:* Design and fabrication methods are fundamentally less complicated than the methods used in the conventional reinforced thin skin construction; they are fewer and simpler. Costs should be a lot lower.

5. *Range:* The experimental wing, if equipped with fuel tanks of the same type as those of the F-80C but designed to fully utilize the internal clear space, will carry about 30 pct more fuel; thus extending the useful range of the airplane.

6. *Strength-weight:* Primary aircraft structures utilizing thick skin with a minimum of auxiliary stiffeners will compare favorable on a strength-weight basis with conventional reinforced thin-skin types of design. In this case the weight penalty was 4 pct of that of F-80C. This could be reduced by careful reanalysis of the design.

Table I lists the magnesium alloys used in one or more of the wings tested. Table II is interesting because it shows highly satisfactory characteristics of ZK-60, a new Dow zirconium-bearing magnesium extrusion alloy. Its notch sensitively is on a par with 14ST aluminum alloy and is better than that of 75ST.

The experimental panels were a complete de-

TABLE I

MAGNESIUM ALLOYS IN EXPERIMENTAL WING*

Commercial Designation	Dow / Amer. Mag.	FS-1h / AM-C52-H	0-1 HTA / —	ZK-60 / AM-XA76S-T3	H-HT / AM265-T4	H-HTA / AM265-T6
Type		Sheet	Extrusion	Extrusion	Casting	Casting
Specification		QQ-M-44	AN-M-25	.....	AN-M-36 Comp. A	AN-M-36 Comp. A
Condition		Hard Rolled	HTA[1]	HT[1]	HT[1]	HTA[1]
Size restriction, in.[5]		.020-.128	None	5 to 10 sq in.	None	None
Tensile ultimate, psi		39,000	47,000	49,800[2]	32,000	34,000
Tensile yield, psi		29,000	30,000	36,800[2]	10,000	16,000
Compressive yield, psi		24,000	30,000	28,600[2]	10,000	16,000
Shear ultimate, psi		18,000	23,000	24,000[3]	16,000	19,000
Bearing E/D = 1.5		58,000			38,000	41,000
Ultimate E/D = 2.0		68,000	70,000[4]	73,000[3]	51,000	54,000
Bearing E/D = 1.5		43,000			20,000	32,000
Yield E/D = 2.0		43,000		51,000[3]	25,000	40,000
Modulus of elasticity		.....	.....	6.50×10^6	.....	.....
Modulus of rigidity		.....	.....	2.4×10^6	.....	.....
Weight per cu in.		0.0645	0.0653	0.0660	0.0664	0.0664

NOTES—* Data from ANC-5, Tables 6-1 and 6-2 except as noted.
[1] HT = Heat treated. HTA = Heat treated and aged.
[2] Values shown were actual measured properties taken from cap strip extrusions furnished for second static test wing.
[3] Values shown are typical mechanical properties per Dow Chemical Co. Technical Service Report No. 39.
[4] Arbitrary bearing value taken as 1.5 F_{TU}.
[5] Properties up to 0.375 in. are essentially the same.

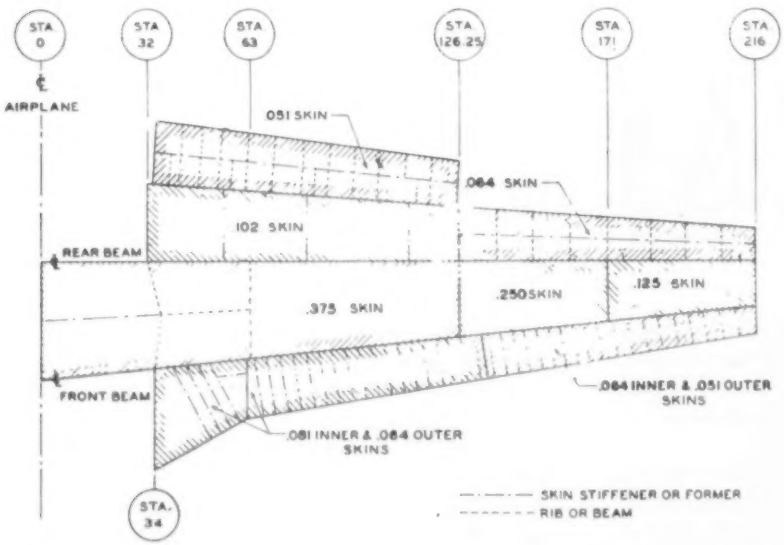


FIG. 2—Variations of skin thickness in the experimental wing are shown in this sketch of its upper surface.

TABLE II

NOTCH SENSITIVITY TESTS

Material	Condition	Tensile Ultimate	Tensile Yield	Ultimate Elongation, % E	Charpy Value (Ft. Lb.)	Notch Stress at Failure	Notch Stress, Tensile Ultimate
0-1HTA	Extrusion	54,500	35,700	6.8	1.0	45,250	0.83
H-HTA	Casting	38,000	.....	.....	.....	30,000	0.79
ZK-60	Extrusion	47,900	37,700	15.5	6.25	59,900	1.23
14ST	Bar	70,400	.....	10.9	5.75	84,000	1.20
14ST	Extrusion	76,300	.....	11.5	.....	95,400	1.25
75ST	Bar	83,500	.....	11.7	.....	92,800	1.11
195-T6	Casting	38,300	.....	4.6	.....	43,450	1.14

parture from the F-80C prototype design. Stringers and chordwise formers in the main load carrying region of the wing (between front and rear beams) were completely eliminated with the exception of one spanwise stiffening member on the upper surface between Stations 0 and 34 (Fig. 2). In the area between the rear beam and the flap beam on the upper surface considerable simplification of the structure was achieved by replacing the chordwise corrugated internal stiffening arrangement of the prototype by four hat section chordwise stiffeners. The lower skin surfaces in this region are removable doors for access to fuel tanks.

On the prototype wing, these doors are fabricated of relatively thin skin reinforced by conventional stiffeners. On the experimental wing, the doors are simple heavy plates, completely free of internal reinforcement. The nose assembly of the prototype wing was constructed of an outer skin reinforced by internal corrugated sheet on the upper and lower surfaces with the corrugations running in the chordwise direction. These reinforcements were interconnected at the extreme leading edge by small stampings.

The nose structure of the experimental wing was designed as a sandwich using inner and outer skins separated by closely spaced rectangular section formers cut from heavy magnesium plate. Although a slight weight penalty resulted in the use of this type structure (primarily due to the formers) the final structure required no forming dies for its fabrication.

Further reduction in the number of parts in the experimental wing was obtained by redesign of the ribs at Stations 0 and 34 as single large magnesium alloy castings, replacing several forgings, webs, and stiffening members used in the prototype.

SPECIAL SETUPS

aid accurate machining

By F. C. SCHWIETERT
Partner, V-S Grinding Co.
Chicago

Standard machines are used in producing record changer spindles to extremely close tolerances. Special setups and machining techniques aid in maintaining accuracy, which is sometimes greater than machine used was designed for.

Willingness and ability to take unusual pains in holding close dimensions on critical jobs has enabled V-S Grinding Co. to attain success in the production of V-M record changer spindles where several potential suppliers have failed to meet the exacting requirement imposed. This company has produced about 5,000 of the spindle assemblies a day over a period of several months while, at the same time, producing somewhat similar spindles of other makes.

Fig. 1, shows the spindle assembly in longitudinal section. Some dimensions have to be held within ±0.0005-in. limits. Others, while not so close, have such a bearing on assembly tolerances that they require more care than is apparent when considering only the dimensional tolerances of individual parts.

Actually, unless certain parts dimensions are held very close to the mean tolerance, the cumulative effect of the variations may bring final dimensions of the assembly outside the specified limits. This is one reason why every assembly must be checked on a precision fixture. Unless such a check is made, the assembly may not meet the critical requirements and must be rejected, even though each part comes within limits. Not until an analysis of the effect of each tolerance is made does it become fully evident how much care is required to attain the end results specified.

As Fig 1 indicates, the major component of the assembly is the spindle itself. It is deceptively simple. It is made from 9/32-in. cold rolled steel bar which, after machining operations, is offset in a press. A longitudinal slot is later cut to accommodate two small stampings. Most other parts are made in screw machines, in some cases with dimensional requirements that are not commonly held on such machines.

Spindle Produced By Screw Machine

Spindle production starts in a Brown & Sharpe screw machine which cuts the bar stock to length after a form tool turns the radiused end. Then a Cincinnati centerless grinder reduces the OD to 0.278 in. after which the work pieces go back to a Brown & Sharpe hand screw machine. Here, after a center is cut in the end and a circular form tool produces a stepped diameter at this end, a 5/32-in. drill produces a hole 2-13/32 in. deep. This hole is held between 0.155 and 0.159-in. diam which is much closer than the maker of this machine said it would hold in a hole of this depth. To hold these limits, the drill is backed off several times.

The form tool has to hold a sharp inside corner at the step and to break the outside corners. Chamfering at the end of the hole is done by the center tool, which is fed in deeper on this account than for ordinary centering. Despite

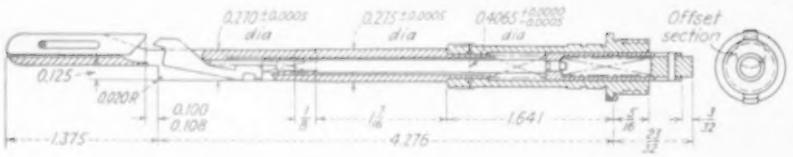


FIG. 1—Drawing of the assembled V-M record changer spindle.

these requirements, about 50 spindles an hour are processed in this machine.

Spindles are next sent to another shop where a press and die are used to produce the 0.125-in. offset specified in Fig. 1. When returned, the shafts go again into a hand screw machine which applies a straight form tool to cut the shelf 1.375 in. from the top end. This makes the workpiece ready for cutting the slot in which the stampings are to be fitted.

Slotting is started with a circular saw that makes a plunge cut through the shelf and and along a part of the spindle that is not offset. For this work the spindle is held in a vise on a hand milling machine, the work being fed in to a stop that gives the required depth. Neither the depth nor the width of this cut are especially critical.

More precise, however, must be the slot produced in succeeding cuts. One of these runs parallel to the axis and is of constant depth through the length of the offset, after which the Woodruf cutter is fed down relative to the work and goes through into the slot previously cut from the other side. Then the workpiece is turned over for a second cut on that side. This work is done on a Cincinnati milling machine equipped with two vises, as shown in Fig. 2.

Table Motion Horizontal and Vertical

In this operation, the cutter rotates constantly on the spindle of the machine but the table is arranged to move parallel to the face of the cutter and also up and down to produce the required cuts. Its motions are automatic. In the first of these cuts, the workpiece moves up, then is traversed parallel to the axis, after which the work piece is elevated again to complete the cut on this side.

After the first cut, the table indexes and a cut is made on another piece in the other vise. For this cut, the workpiece is fed up and then traversed a short distance to complete the cut. Tolerance on depths of cuts are 0.001 and 0.0015 in. respectively. Width tolerance is ±0.001 in. Vises are equipped with special jaws that include keys for locating the workpiece correctly as to angle and longitudinal position.

Setup is such that the vises are loaded alternately, a new workpiece being placed in the left vise while the one in the right vise is being slotted. That taken from the left vise is turned over and put in the right vise after the first cut is completed. The machine keeps repeating its cycle automatically so that the operator spends nearly all his time in loading and unloading. Some of his time is spent gaging occasional pieces to be sure that specified limits are being held. Complete slots are milled in 60 pieces an hour.

Slot milling completes the machining operations on the spindle itself, save for the drilling of cross holes. At assembly, these holes receive pins whose function is to locate the stampings that fit in the slot. This drilling is a critical operation because the precise location of the pins is critical, as it has important effects upon functioning and upon holding certain dimensions in the assembly.

These reasons, and the specified location of the holes—not through the axis but well away from it—have a tendency to make the drill run out, so a precise and rigid fixture, equipped with a long bushing to hold the drill true, is needed. One of these fixtures, in a Delta press, appears in Fig. 3. The other, for the 0.032-in. hole, is similar but is used in an Electric Mechano press having a spindle speed of 15,000 rpm.

Spindles Plated Before Assembly

After the foregoing operations and before assembly, the spindles are sent to a plater where they are polished on a hand wheel and then receive coats of copper, nickel and chromium. Allowance has to be made for the thickness of the plating in certain of the foregoing operations because it is the plated spindle that enters the assembly and must yield the finished dimensions specified in the assembly drawing. The same applies to the stamped parts although

FIG. 2—Setup for milling slots in spindles held in the special jaws of two vises loaded alternately. The table is given a compound automatic motion in a cycle that constantly repeats.

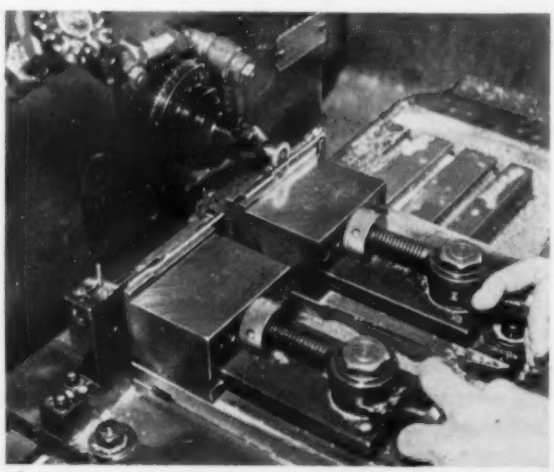


FIG. 3—One of the fixtures for drilling off-center holes precisely located and held within close size limits. A long drill bushing helps to attain desired results.

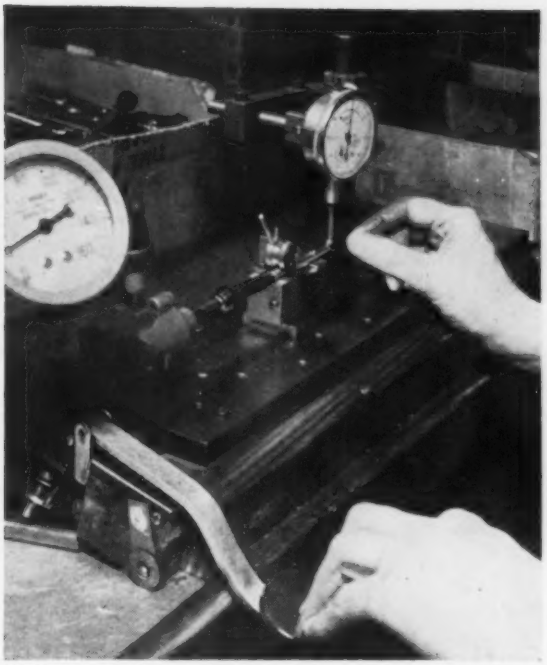


FIG. 4—Special air operated fixture used to make precision checks on every assembled spindle. Motion imparted to the pushrod must move the stamped components within close limits indicated on the dial gage.

they are purchased and are plated by another supplier.

Another component of the assembly, termed a base, is a sleeve into which one end of the spindle fits. This sleeve has at its lower end a thread running remarkably close to a flange, and is drilled out to receive another sleeve arranged to move longitudinally in the hole. Most of the machining of the base is done from ⅝-in. cold-rolled bar stock in two Brown & Sharpe automatic screw machines. One of these performs the following operations: (1) Feed out; (2) turn with a box tool; (3) produce barrel undercut with a swing tool; (4) cut center in outer end; (5) drill ID; (6) ream ID; (7) form OD; (8) cutoff.

In the second machine, the workpieces are loaded one at a time over a pin on the turret, and are inserted by this pin into the spindle collet. Then the hole through the workpiece is enlarged over most of its length and is reamed. The final operation is to produce the thread with a split die. All tools in this machine are on the turret.

Base Completed On Press

To complete the base, its flange is struck by a punch in a press to produce a slight projection on the side toward the thread and a slot on the opposite face. Then the two bearing diameters inside the flange are centerless ground. Subsequently, this piece is given a black oxide finish.

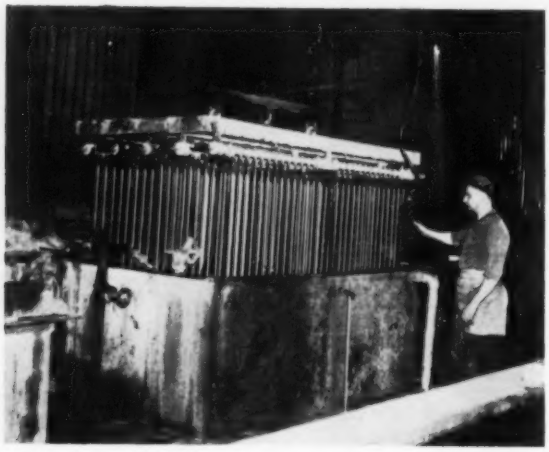
Running through the center of the assembly is a pushrod having a hooked end to engage one of the two stamped parts. This is a cold rolled steel bar machined on a screw machine in fairly conventional operations.

To fit the bore of the base, a sleeve is produced from ¼-in. brass rod on a screw machine. The large hole in which the spring fits is drilled out before the workpiece is cut off the bar. A small hole is then drilled in one end to fit over the knurl on the pushrod, and a punch is used to piece out two short longitudinal slots in the walls of the workpiece near its lower end.

After assembly, a check of functioning and critical dimensions is made. This check is made by locking the assembly in the fixture, Fig. 4. In this fixture, motion is produced by admitting low pressure air to a ram that moves the pushrod assembly longitudinally. The dial gage shown responds to motion of one of the stampings. If the motion is not within certain limits there is either some dimensional fault in one or more of the assembled parts or else cumulative tolerances are excessive.

Actually, since there are several dimensions that can vary within certain limits and still provide parts that are acceptable, some degree of selective assembly can be used. If the first combination tried does not yield specified results, some other combination can often be found.

The nearer the parts come to mean dimensions, the more likely it is that an acceptable assembly will result at the first try. In practice, this result is often attained. But it has required long experience in production and assembly procedures to attain this result.



CONDUIT being lowered into the first bath in the finishing process.

Electric metallic tubing given protective coatings

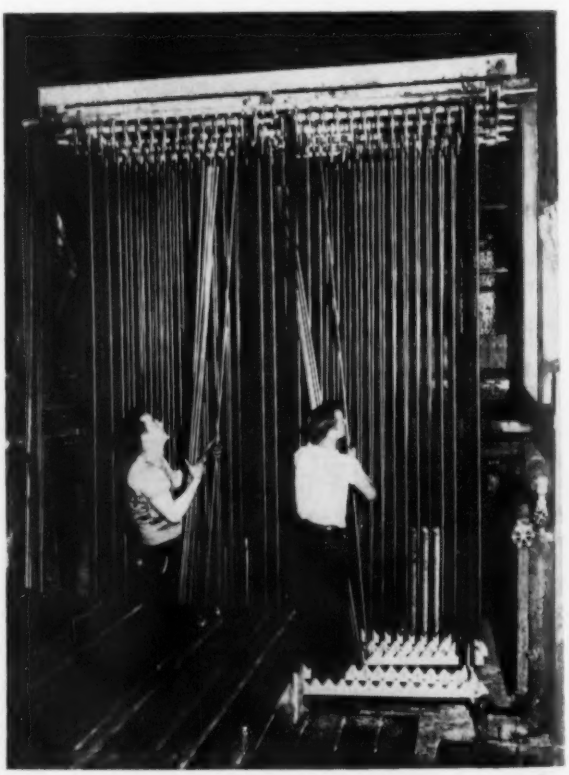
Steel conduit is now being given a complete exterior and interior surface finish to give it added protection. The tubing is made at the Etna, Pa., plant of National Supply's Spang-Chalfant Division. It is a light-weight steel conduit and is adaptable to a wide variety of electrical raceway services.

Manufactured from cold strip, the tubing is made in an electric resistance weld tube mill and cut off into 10-ft lengths. Then the ends are reamed and chamfered. Next the tubing is ready for the surface finishing consisting of zinc electro-plating the exterior and lacquer coating the interior.

To begin the finishing cycle, the tubing is loaded into cages which are suspended from a Mono-rail crane. The tubing is first given a bath in sulphuric acid, then rinsed in water, and moved to the electro-plating tank, where it receives an exterior coating of zinc. When the plating has been completed, the cage moves on to another clear water rinse, and then to an acid bath to brighten the finish. Before the conduit is removed from the cage it is given a hot water bath.

Unloaded onto an inside painting rack, the tubing is placed against nozzles which force a clear lacquer over the interior surface. It is removed from the nozzles and conveyed along racks past hot air fans which dry this fresh lacquer coating.

LOADING electric metallic tubing into cages. The tubing is transported on these cages through the electro-plating cycle.



CRITICAL MATERIALS

and substitute steels theme of ASM *show*

Critical materials, aircraft production and oil and gas industry problems were high spots of the Western Metals Congress and Exposition held last week at Oakland, Calif. There were 175 exhibitors; while many papers were general in scope, there were some new developments and at least one hot discussion.

A new "probe" for nondestructive testing of stainless steel, based on magnetic permeability, was described by Bernard Gross, director of laboratories, Rohr Aircraft Corp. It is used by Rohr to test incoming quarterhard, etc., sheets to see if they need annealing prior to forming. It is also being used between forming operations to measure the extent to which the material has been hardened by cold work.

Certain critical parts are inspected to see if they need annealing before welding or trimming. The probe is connected through an amplifier to an oscilloscope. Using a fully annealed section as a standard, the inspector can tell by the length of the pip on the scope—a measure of its magnetic permeability—whether the part he is checking is suitable for further processing without annealing.

W. A. Saylor, metallurgist, Consolidated Western Steel Corp., threw a little light on the No. 1 mystery of the line pipe industry: Failure of

Boron steels, linepipe failures, new aircraft practices and nondestructive testing were covered during the technical sessions. Shortages of certain alloys, some believe, are partially due to plain waste. Attendance did not come up to advance expectations.

lines on test after installation. The cause is well known—goughing and scratching of the plate in transit or installation. But why some failures are 180 ft long and others 3200 ft long is still anybody's guess, Mr. Saylor said.

About the only things deduced so far, he noted, is that the failures (which look as though there had been an internal explosion) always follow a sine wave pattern and usually start where pipe is in a depression following the contour of the ground. Some burst while the pumps were running, others under static pressure.

Several important trends in aircraft assembly were outlined by T. E. Piper, Northrop Aircraft, Inc. Among them are a method of retaining aircraft bearings by "roll swaging," instead of staking, the former accepted method. Another is "blind riveting." He pointed out that the method is very old but that a new rivet now available should overcome much of the designer's hesitancy to use the process. He also described a new high-strength fastener that has answered most of the dreams of aircraft designers.

Commercially pure titanium is not yet being used in airframes as a structural material but is being used for its oxidation resistance, reported Leo Schapiro, Douglas Aircraft Co. Because of the weight saving, its use as a replacement for annealed stainless steel is gaining favor for such applications where temperatures do not exceed 800°F. Commercially, evaluation of the cost of the weight saving has limited this type of application.

But Mr. Schapiro said that the early promise of high strength titanium alloys may produce a revolution in the airframe industry.

A panel on critical materials and substitutions got into a brisk discussion on boron treated steels. Fred J. Robbins, president, Sierra Drawn Steel Corp., an outstanding authority on boron treated steels, was emphatic on one point. He did not consider them as substitutes. Plomb Tool Co., of which he is also vice-president, has used some 40,000 tons of boron steels since 1945. He reported raising the number of pieces per die sink from 11,000 to 26,000; improved machinability on secondary operations and other substantial cost savings from their use. When steel

Some of the participants in the panel discussion, "Conservation, Utilization and Substitution for Strategic and Scarce Materials," are shown below. Left to right: W. E. Jominy, staff engineer, Chrysler Corp.; J. B. Austin, director of research, United States Steel Co.; R. L. Wilson, director of metallurgy, Timken Roller Bearing Co.; Elmer Gammeter, director of laboratories, Globe Steel Tubes Co.; John Chipman, director of metallurgy, Massachusetts Institute of Technology and T. G. Digges, National Bureau of Standards. Mr. Jominy is president of ASM and Mr. Chipman is vice-president.

extra charges for guaranteed hardenability were added, his company began to specify 0.20 to 0.40 Cr. Prior to that they had not specified chromium or nickel, but without it the hardenability curve breaks sharply.

At the same session, James B. Austin, director of research, U. S. Steel Co., Kearny, N. J., answered a question on use of oxygen in blast furnaces by saying that he did not know what competitors were doing in this country but that, based on German experience, he doubted that oxygen would help operations in a healthy blast furnace. He felt it might help a sick furnace but that its greatest value in the blast furnace would be in ferroalloy furnaces.

Manganese Not Easily Replaced

Dr. Austin also scoffed at suggestions for substituting ferrotitanium for manganese on the ground that costs were very much against it. Nor was there any assurance of enough power in the country to make the quantity of ferrotitanium that would be needed. Such talk is whistling in the wind, he said; it may be a solution in specific cases but not a major solution.

Use of phosphorus as a hardening agent was suggested by John Chipman, head of the metallurgy department, Massachusetts Institute of Technology. Walter E. Jominy, Chrysler Corp. and ASM president, agreed in part, but pointed out that phosphorus raises notch sensitivity, however, it should be considered for certain sections.

It was pretty well agreed that alloys were going to become scarcer than they were during World War II. At this point Mr. Robbins let out a blast at the way industry wastes alloys. "Instead of talking about what we want, we should talk about what we need to do the job. We are wasting alloys by carelessness, but not tailoring our specifications to field service requirements. We have just added alloys to cover up lousy heat treatment."

Comments on magnesium were brief but pointed. J. D. Hanawalt, manager, Magnesium Div., Dow Chemical Co., said that what is needed in the magnesium industry is additional competitive economical ingot production capacity.

The shortage in magnesium-zirconium alloys is only temporary, said Mr. Hanawalt. It's just a matter of simple furnaces, and that will soon be taken care of, he added.

Pointing up some of the problems in titanium, G. T. Frazer, Rem-Cru Titanium, Inc., remarked that unlike steels, titanium has no cousins. Each of its problems has to be worked out separately. Before long, he said that aircraft alloys up to 200,000 psi would be available, presenting no exceptional problems in fabrication. One such alloy has already been made and tested in small lots.

Suggesting one way of stretching tungsten supplies, R. L. Wilson, director of metallurgy, Timken Roller Bearing Co., mentioned molybdenum. Once we get a larger output of molybdenum, which was cut back following World War II, we might take the tungsten out of some high-speed steels and substitute 8 to 9 pct Mo and 3 to 4 pct V.

NEW BOOKS

L'Industrie Siderurgique dans le Monde et son Evolution Economique Depuis la Seconde Guerre Mondiale (The Iron and Steel Industry of the World and its Evolution Since the Second World War), comprises an economic study of the present status of the industry in each of the important producing countries. Considerable data is presented on the resources, plants, programs and potentialities of the industry, both in Iron Curtain countries and elsewhere. Material is given on the problems of German industry. Presses Universitaires de France, 108 Boulevard Saint-Germain, Paris. 500 fr. 398 p.

Machinability and Machining of Metals, by N. E. Woldman and R. C. Gibbons, is a practical manual that explains the metallurgy and machining characteristics of the different metals and their alloys, and methods of material and processing selection. The book suggests tool design, cutting speeds, feeds and type of cutting fluid which will produce best results. It also covers new developments. McGraw-Hill Book Co., 330 W. 42nd St., New York 18. $7.50. 518 p.

Major Problems of United States Foreign Policy 1950-1951, is the fourth in a series of annual volumes dealing with U. S. foreign policy problems. It gives a brief survey of the world situation, outlining the character of international relations since the end of the war and the efforts made by the major powers to coordinate these relations in the United Nations. An account is given of the fundamental and continuing objectives of the United States, Great Britain and the Soviet Union. The Brookings Institution, Washington 6, D. C. Cloth bound, $3.00; paper bound, $1.50. 416 p.

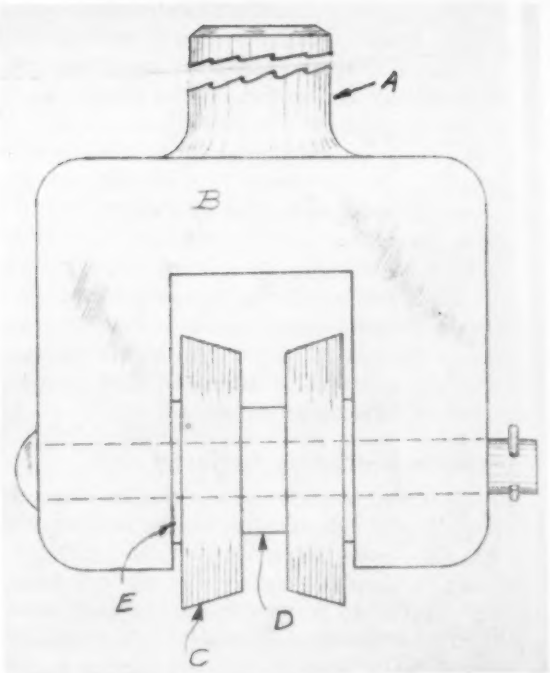
The Condensed Chemical Dictionary. This fourth edition contains 23,000 entries giving the latest authoritative information on chemistry, raw materials, trade names and processes. It covers all recent developments and will be of value to everyone needing quick, accurate information on chemicals and related materials. For the first time, the dictionary includes hundreds of definitions of common chemical terms. Reinhold Publishing Corp., 330 W. 42nd St., New York 18. $10.00. 740 p.

SIMPLE TOOL heads soft, drilled rivets

The accompanying sketch shows a tool that can be readily made by any good toolmaker, and which can be employed for heading soft end-drilled rivets. It is particularly good for brass or copper rivets which have been produced on a screw machine, with their ends shallow-drilled to leave an elevated rim around the edge to be utilized in heading. The tool shown spins this elevated edge of the rivet end, flowing the metal in both directions to produce a satisfactory head.

The shank, A, is made straight, with proper diameter to fit the chuck of the drill press to be used. The body of the tool, B, has a channel milled straight through it to receive two special hardened and bevel-faced rollers, C, and a separating washer, D. The thickness of D, which determines the distance between the hardened rollers, must be substantially less than the diameter of the holes in the ends of the soft rivets. Each hardened roller has an integral hub portion, E, turned to less than the roller diameter to lessen friction of the rollers against the tool body.

The pin on which the rollers and the spacing washer are mounted is also hardened. Since this is held by an ordinary cotter pin, it may be readily removed. It is removed occasionally for lubricating the bearing areas on the pin.



One tool may be made suitable for heading soft rivets of different diameters, with holes of varying diameters drilled in their ends. This is done simply by varying the thickness of the washer, D. In the sketch, D, is the maximum thickness that can be used in this tool. If a thinner washer is used, compensation is made by using thin washers between the roller hubs and the tool body.

It is possible to use a tool of this kind in some instances while work being riveted is held manually under the drill chuck. But much better satisfaction is obtained by arranging a fixture to hold the workpieces, so that the rivets will be centered under the tool automatically, and with greater accuracy.

Flexible welder aids accessibility

When the Great Northern rebuilt 400 of their ore cars, the Unionmelt flexible welder was used for many operations. Welds were made at high speeds in places hard to get at with other automatic welding machines. The flexible hose and nozzle covered an area of 1000 sq ft. But even this range was increased for one of the operations on the new car baskets.

By using an air-operated elevator device to raise and lower the rod and melt feed machine, the range was increased 80 pct. In the upper position, plug welds were made through rivet holes on reused side stakes. Lowered, the flexible welder was used to make buttwelds between end and side slope sheets.

news of industry

Scrap Shortage May Ease—Scarcity to Linger

Expanding steel, consistently high rate has taxed scrap supply . . . Former easy market vanishes . . . Higher prices prime pump . . . See more reliance on hot metal—*By Ted Metaxas.*

New York—Stocks of scrap iron and steel that started to sink last year have been scythed down by the "sudden" shortage that may reap a toll of idle openhearths. Scrap price rollbacks have been tagged scapegoat but the market's afflictions are more chronic. What the price order has done is to wedge into an uncomfortably shorter period what should have been a gradually intensifying siege of scrap scarcity.

In the past decade the scrap supply has been progressively overtaxed by the steel industry's consistently high and expanding rate of steelmaking. The pump has been primed with higher scrap prices but the pre-World War II easy supply has vanished. Supplies slumped from last September to Jan. 1 to an average of 30 to 35 days instead of the safe 60.

Reliance on Hot Metal

On the logical assumption that future scrap supply cannot meet expanded demand, reliance on more hot metal to fill the scrap deficit may restore market balance. It may mean building of more blast furnace capacity and heavier sapping of iron ore supplies. National Steel Co.'s new Paulsboro, N. J., mill will be heavier than normal on pig iron potential and New York brokers have reported that the Fairless Works will also put its faith in foreign ore for more hot metal.

Normal scrap supply has been outclassed by the sustained demand. Gone are the characteristics of the formerly easy market —lower steel capacity, dips in the steelmaking rate and seasonal lulls that gave scrap sources a chance to pause and accumulate. Now rearmament and the eventual re-release of stored-up civilian demand assures that mills will work the limit for some time. The ingenuity of the scrap trade will constantly be fighting a long-term scarcity.

Desperation campaigns — salvage drives, plant hunts for scrap, etc.—will in months to come take the bite out of the shortage. It will ease up anyway when the market regains its balance from the control order. But before this, operating rates may stumble and some warn the scrap supply cannot support the expanded steel industry of 1952.

Steel can guarantee itself the traditional 50 pct of home or plant scrap. Its vulnerability lies in free or purchased scrap.

Turning point was 1940 when steel had an 81 million-ton capacity operating at about 82 pct. About 20 million tons of scrap was purchased. From then through 1949 demand climbed to an average of 25 million tons annually. Now it has hopped to a higher but still possible perch of 32.5 million tons. But with even bedrock conservatism 1953's 120 million-ton capacity will need at

Turn Page

Salvage Ship Scrap

Washington—Ships sunk or beached in World War II action on and around Pacific islands will be salvaged for scrap metal. The Navy estimates that more than 400,000 tons of scrap can be recovered from vessels at Palau, Saipan, and Truk. Private companies have been asked to bid for salvage rights. If this operation proves practical it will be extended to other areas.

Nearly all the destroyed craft are Japanese warships and merchantmen.

Connors Expansion Contracts

Pittsburgh—Connors Steel Co., Birmingham, Ala., division of H. K. Porter Co., Inc., has let contracts for its $2 million expansion program that will increase capacity 40 pct to 84,000 annual tons.

Rust Engineering Co. will engineer and install a 15-ton electric furnace, a billet heating furnace, and modernize the present heating furnace. Treadwell Engineering Co. will furnish an 18-in. breakdown mill.

Koppers to Build at Fontana

Pittsburgh—Koppers Co., Inc., plans to build a plant for making enamel pipe coatings and roofing materials on a 158-acre site at Fontana, Calif., adjacent to Kaiser Steel Co.

Arrangements have been made with Kaiser for supplies of pitch from coke ovens. The plant, which may be in operation before 1952, would be the first of its kind west of the Rockies.

INDUSTRIAL SHORTS

Reheating Furnaces — RUST ENGINEERING CO. will design and engineer two slab reheating furnaces to serve a hot strip mill of Societa Italiana Acciaierie di Cornigliano at Genoa, Italy. The furnaces will have a capacity of 65 metric tons per hr each.

Titanium Research — U. S. Bureau of Aeronautics has awarded a contract to the research division, N. Y. University College of Engineering, to cover studies on titanium alloyed with aluminum and chromium.

New York Opening—The M. N. LANDAY CO., Pittsburgh, has opened a steel products division for the handling of domestic and foreign steel mill products at 30 Church St., New York.

Mechanical Brains—Mechanical brains will play an important role in the automobile industry of the future according to 400 computing experts, business and labor leaders who assembled at WAYNE UNIVERSITY, Detroit, to discuss the uses of automatic calculators and their applications.

Peace Pattern — "Pattern for Industrial Peace," the story of union-management relations at the Chicago plant of INLAND STEEL CONTAINER CO., will be distributed to all personnel of the plant.

Diesel Production—Diesel locomotives will soon be produced in Australia by the Electro-Motive Div. of GENERAL MOTORS CORP. and the CLYDE INDUSTRIES of Sidney. The first locomotive produced is expected to be in use late this year.

Planning Guide—For any industrialist who's been promising himself that "someday I'll look into this matter of air conditioning," WESTINGHOUSE ELECTRIC CORP. has a 20-page planning guide he'll find most helpful. For a copy send to the Sturtevant Div., 200 Readville St., Hyde Park, Boston 36.

New Castle Location — Pittsburgh divisional offices of MICHIGAN LIMESTONE & CHEMICAL CO., U. S. Steel subsidiary, have been transferred to New Castle, where operating and engineering offices have been situated.

New Offices—THE INSTITUTE OF SCRAP IRON & STEEL INC., will occupy larger new headquarters in the Editors' Building in Washington, D. C.

Structure Started—The 30-year-old Chicago concern, J. J. TOUREK MFG. CO., manufacturers of precision screw machine products, ball joints, and pipe plugs, is building a new plant at 1901 S. Milbourn Ave.

Pipe Line in Pa.—Texas Eastern Transmission Corp., has awarded a contract for laying of 35.7 miles of 30-in. pipe line in Fayette and Westmoreland Counties, Pa., to the MAHONEY CONTRACTING CO., Lansing, Mich.

Announcement—The assets and business of Austin-Western Co., Aurora, Ill., has become a part of the BALDWIN-LIMA HAMILTON CORP. Austin-Western will continue to serve its customers under its own name.

New Legislation—At a special meeting of the Electric Industrial Truck Assn., it was voted to open membership to manufacturers of gas-powered industrial trucks and tractors and to change the name to THE INDUSTRIAL TRUCK ASSN.

Western Service — To better serve southern California and Arizona, a complete warehouse and sales office at Vernon, Calif., has been opened by the BASSICK CO., Bridgeport, Conn.

Exclusive, S. A.—U. S. Pipe & Foundry Co. has appointed INDUSTRIAL STEELS, INC., of Cambridge, Mass., their exclusive sales agent on metal mold cylindrically shaped stainless steel castings for the New England area.

least 36 million tons — unless steelmaking methods alter.

The pre-controls urge to ship sucked everything out of dealers' yards. Dealers wanted to dodge rumored price rollbacks and some consumers wanted supply security at any price. Thus yard backlogs of scrap were cleaned out and sources ravished. It caused inequitable distribution that put the exclamation point to the shortage.

NPA is slowly chopping at inequitable distribution with allocations. For instance, it is routing scrap out of the Chicago district which some regarded as comparatively well-stocked.

Allocations now are about half of scrap shipments. A symptom of the shortage that will intensify, they will not discover a bonanza of scrap but will make best use of available supply.

The usual March through May thaw period for scrap movement was knocked off its timetable by high winter buying and pre-control shipping. It was condensed into January. Warmer weather is awaited to loosen up farm equipment and other frozen scrap.

Disproportionate Rise

Most in the field regard price controls as a necessary evil. Scrap prices normally hug the ingot rate. But when capacity and operating rate surge beyond the point of easy supply, a steep price rise disrupts the ratio.

Virile competition of a swelled steel industry and a desire to bring out more scrap may send future decontrolled prices on an unreasonable upward flight that may uncover only a proportionately negligible tonnage. Scrap-short Europe is expected to keep a possessive hold on its scrap metal and will control exports.

Scrap men are now waiting for seasonal improvement of the scrap flow. They expect the tightness to ease up. But the withered inventories of today are a setback that must be offset before they can start rebuilding stocks for next fall and winter. Completion of more and more new capacity will make their task an obstacle course.

Bethlehem Ship Comes In at Sparrows Point

S.S. *Bethore* docks with first load of Venezuelan ore . . . Trip from Puerto de Hierro took 9 days . . . Expect 1 million tons in 1951 and 3 million in 1953.—*By Bob Hatschek.*

Sparrows Point — Last Thursday, the first 23,850 tons of iron ore arrived here from Bethlehem Steel Co.'s new mine in Venezuela. Many dignitaries were present from both the Venezuelan embassy and Bethlehem but the ore was star of the show; the *S.S. Bethore* arrived with open hatches and overhead cranes were hauling out the red ore almost as soon as the ship had tied up.

Present mine production is about 2000 tons per day and, as soon as she has completed her present voyage from Chile, the *S.S. Steelore* will join her sister ship in the Venezuelan run. Bethlehem then plans to let ore pile up in Venezuela before other ships are put on the run.

Supplement Chile Shipments

The company expects to bring in 1 million tons of this ore in 1951. Production plans then call for about 3 million tons in 1953 and may later go as high as 5 million tons. This source will bolster shipments from Chile and other countries which are needed in the company's current 2.6 million-ton steel expansion program.

The arrival of the *S.S. Bethore* was the climax of a story begun 25 years ago when a native prospector named Simon Pinero discovered a rich outcrop of iron ore in the Venezuelan jungle. Seven years later, Bethlehem acquired the property and now owns some 20,000 acres at El Pao.

Construction was started in 1941, but war and other factors combined to delay until last week the first shipment of high-grade hematite. The ore assays better than 60 pct iron and is suitable for either blast furnace or openhearth use. Most of it will be consumed at Bethlehem's Sparrows Point works here.

In Venezuela, the ore is taken from the pits, crushed and loaded onto freight cars for shipment to Palua, the Orinoco River terminal. Then it is taken on river craft to Puerto de Hierro (Port of Iron) and loaded on the ocean-going ore ships for the 2000-mile voyage to Sparrows Point.

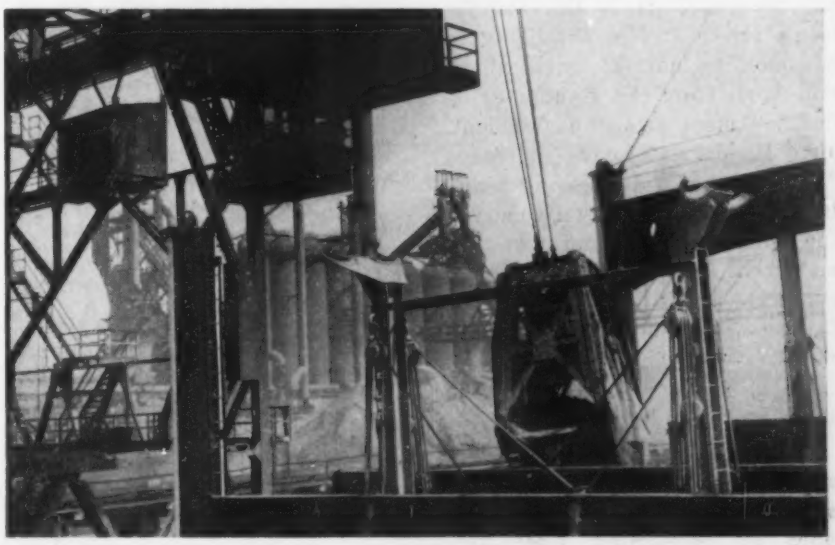
Development Project

The location of the ore body, in jungle about 7° north of the equator, necessitated a tremendous development program by Bethlehem. All materials and equipment for mine, power, rail and other facilities was shipped from the United States and most of it went up the Orinoco in barges or shallow-draft steamers to Palua.

Not only industrial facilities were necessary. Three new communities, complete with schools, recreation facilities, commissaries, a hospital and other civil needs, had to be carved from the jungle. The peak construction period saw some 2400 men at work and now more than 1000 men are employed there.

Among Bethlehem's other South American ore sources is the Romeral deposit in Chile which is now being prepared for production. Ore from this deposit is magnetic, similar to that taken from the Tofo mine, which has been producing for several years. Railroad facilities and a harbor at Guayacan are being readied.

A BUCKET hauling out one of the first loads of Venezuelan ore from the bunkers of the S. S. *Bethore* only a few minutes after the ship was docked. In the background can be seen one of the blast furnaces that will soon be using it.



Freight Car Building Just Meets Scrapping Quota, Says Hood

U. S. Steel official says even 10,000 goal will not meet rising demand.

Pittsburgh — The freight car construction program is barely enough to offset retirement of worn-out equipment, much less keep pace with expanding industry, notably steel, said Clifford F. Hood, executive vice-president—operations, U. S. Steel Co. He spoke to railroad men and shippers at an Allegheny regional advisory board meeting.

Even when the car-building program attains the 10,000-car-per-month goal—not likely before May or June—the net gain will be only 4000 cars per month, since car retirements are running around 6000 per month. Mr. Hood said this would add about 2 pct per year to the freight car fleet or about 2 million.

"Judging by the steel industry," he said, "the increase in production and in transportation requirements will be greater than 2 pct per year." For every ton of finished steel shipped, he added, more than 5 tons of other materials must be moved. Two years hence the industry may have finished steel capacity of 90 million tons.

Normal by April

U. S. Steel Co. is only about 50 pct recovered from the switchmen's strike and is not likely to be back to normal until about mid-April from the standpoint of finished steel awaiting shipment. Mr. Hood said car shortages "have reached a distressing peak" this month. In our own company the tonnage piled and awaiting movement reached alarming proportions. Indications are that the fall peak of traffic will result in serious car shortages, he said.

To alleviate the shortage, the steel executive proposed:

That industry generally, when possible, load and unload cars on a 7-day week basis, such as is done by integrated steel producers. A 5-day shipping and receiving week is inadequate, he said.

That railroads continue reducing the number of cars needing repair; that they make certain yard facilities are adequate to do the job required; that the roads consider holding off retirement of some of the better steam locomotives in case they are needed.

That shippers remove dunnage and debris from cars to eliminate time spent in cleaning them for re-use; that shippers improve facilities for loading and unloading; that railroads increase the construction of big gondolas—52-footers and even 65-footers; that box cars be built with door widths of at least 8 ft, in some cases 10 ft.

Shortage, Controls Plague Merchant Iron Field

Gap between supply and demand grows . . . Some feel that partial controls work against market . . . Foreign iron moves as far as Chicago . . . DO's troublesome—*By Bill Lloyd.*

Cleveland—Consumers and producers of merchant iron this week found themselves in a deepening dilemma, posed by a growing imbalance between supply and demand and the suspicion that partial control, through DO's, is possibly less effective than no control at all.

None Shut Down—Yet

Consumers in eastern Pennsylvania and the Midwest, Cleveland, Detroit and Chicago, are competing for every ton. Eastern Pennsylvania consumers are reportedly the hardest hit. The area has only three potential suppliers and outside tonnage must come from Buffalo, Troy and Pittsburgh—also in short supply.

Some smaller foundries are critically short, but thus far no foundry has had to shut down. Foreign iron, however, is moving as far west as Chicago.

Some foundrymen report they're not only hard put to get iron, but to get the analyses they need as well. A serious shortage may be shaping up for the next 90 days. By July 1, producers reason, some sort of CMP will probably be set up, which will bring the facts out into the open. As one producer put it, "right now we have rules and regulations, but no police force."

Another producer pointed out, "some customer that has never bought a pound from us comes in and hands us a DO order, gives us a 45-day lead time and we have to sell him. Then we have to take this tonnage away from somebody else. We can't do a job for defense and non-defense simultaneously."

Merchant iron is not adequate to present demand. About 2 years ago, furnaces were being taken off and producers had tonnage on the ground. Today it would be difficult to estimate how much additional merchant iron tonnage the market could absorb.

No Immediate Relief

Two new furnaces are on the way, one in the South and one in the North, but neither will help the market immediately. The

quick extremes in merchant iron demand have dampened the enthusiasm for expansion in some parts of the industry.

Merchant iron consumption last year totaled about 7 million tons, of which malleable and foundry grades comprised 5 million tons. In addition, an estimated 700,000 tons of foreign iron, including Canadian, was brought in last year. But as the volume of defense production increases in Europe and Canada, the tonnage available for export to the United States is likely to be limited.

A secondary factor in demand for merchant iron is the shortage of scrap, which is reaching epic proportions in the cast grades.

Shortage on Shortage

Integrated producers who sell merchant iron also need scrap. "We need every ton of iron we can make for our openhearths," one merchant iron executive said, "for every ton of iron we ship out one gate we have to bring in a ton of scrap through another and the scrap isn't nearly as good."

The next 90 days will probably see a big scramble for merchant iron tonnage. Producers believe the situation will correct itself, but only under a controlled materials plan.

What producers are trying for is an equitable distribution among old customers and newcomers with DO's. Foundries are trying to maintain their civilian business on top of their defense orders. But the spread of tonnage is too thin to permit a market half-controlled and half free.

Truckers Seek Restriction Ease-Up

Pittsburgh — Iron and steel truckers have asked Defense Transportation Administration to direct states to ease up on weight limits for duration of the emergency, as was done in World War II.

The move is aimed chiefly at Pennsylvania, which is enforcing weight limits strictly. If something isn't done soon, truckers say they may be forced to up Pennsylvania rates 50 pct to compensate for restricted loads. Part of the rate increase would cover establishment of transfer cranes at the state line, an arrangement the carriers estimate would cost them 15¢ per 100 lb, which would be passed on to shippers and buyers in Pennsylvania. Meanwhile, a general 10 pct rate increase is scheduled to go into effect, partly in May, the balance about a month later.

Steel's Cry for Manganese Brings More from Home, Abroad

Domestic production shows spurt . . . Consumption reaches new high.

New York — Outcome of the steel industry's insistent cry for more and more raw materials is the rise in production of domestic manganese ores and stepped-up imports during 1950, according to the U. S. Bureau of Mines.

Domestic production of ore last year of 35 pct or better manganese was 139,000 tons, up 10 pct from 1949, and highest since 1946 when production was 143,635 tons. Bulk of the ore came from Montana and Arkansas.

A new high for domestic production of ferromanganese was set. Fourth quarter production reached 215,100 tons, and production for the year rose to 717,423 tons, 2 pct above the previous high record set in 1944.

Imports of 35 pct or better manganese ores reached an all-time high of 1,837,950 tons from all sources, with India, Union of South Africa, and the Gold Coast supplying 78 pct. Russia, which in 1948 supplied 34 pct of our imports, slumped to less than 4 pct during 1950.

Consumption of ore for manganese alloys in 1950 totaled 1,520,494 tons, well above the 1944 previous high of 1,593,098. Consumption of ferromanganese by steel ingot and casting producers reached a new high of 764,805 tons. Stocks of ferromanganese in the hands of steel makers and alloy makers were 164,963 at the end of 1950.

BITS AND BRIEFS

By Bill Packard

Some small firms whose stock is for sale on the market are shivering at the amount of money racketeers have to invest in legitimate business. Prediction: Kefauver's book on crime investigation of easy dough and politics will be a best seller . . . White collar workers getting the works from the stabilization board. No forms for white collar workers, no one to OK the forms if they did have them, and no vocal spokesmen—just nothin', nowhere, nohow . . . **Number of firms pleading scrap poverty to NPA is staggering. Not all are getting allocations and requests granted are drastically scaled down** . . . Arthur D. Little says potato chips account for about 9 pct of all potatoes consumed, taking 22 million bushels in 1950. This is over 80 pct of potatoes processed for food—a $200 million business . . . **Caution: Manufacturers planning to substitute plastics for scarce metals had better take a second look. Plastics market has greatly expanded, some types being scarce as metal. Plastics makers also have raw material pains** . . . Gray market gem: Steel buyer invited to Sunday breakfast at swanky Long Island home of gray market operator. Butler let him in; he was royally entertained and signed contracts right and left, but never received a pound of steel. Question: Who pays the butler? . . . Budd Company has defense contracts totalling more than $110 million. Included are parts for tanks and jet engines, ammunition, truck cabs, cargo bodies, wheels, hubs and drums . . . Extensive experiments on belt links for machine gun ammunition made from cold-rolled carbon steel strip have been completed by Quality Hardware Div. of Continental Copper & Steel Industries and Army Ordnance. They report savings in material and cost . . . **Who is thinking of building a $70**

million rolling mill at New Haven, W. Va., near Parkersburg? . . . A. O. Smith is back in the landing gear business, first time since World War II. They're making them for the Boeing B-47 Stratojet medium bomber called the world's first sonic-speed bomber . . . Seems just yesterday government was hammering at steel for not expanding. Now government closes the gates and says, "Looks like enough, boys." Don't worry, question will come up again.

Big Inventories Ease Hardware, Appliance Cuts

Overgrown inventories worry market experts more than shortages . . . Metal restrictions won't be felt at retail level for 6 months . . . Toys turn plastic—*By Bill Packard.*

New York—Material austerity is being felt by appliance and hardware manufacturers, but wholesalers and dealers are bulging with inventory. The weight of metal restrictions is not expected to bear heavily on the retail level for another 6 months.

Credit Risks Seen

Right now, overgrown inventories are causing more wrinkled brows among marketing experts than anticipated shortages. They admit that some shortages may appear later this year, but they believe that overall production of appliances and hardware will still be at a very high level.

Of more immediate concern is lengthy extension of credit to dealers and wholesalers—even a moderate setback could bring their whole business structure tumbling down under the weight of too-heavy inventory supported by over-extended credit.

Scare Buying Melts Away

Consumer buying is still at a very good level, although it isn't keeping pace with purchasing by dealers and wholesalers. One big reason is Reg. W. Its effects are showing up especially on more expensive items such as television, radios, refrigerators, etc., which are actually backing up in some showrooms.

"It is still the general feeling that 1951 sales will equal, perhaps even exceed, the volume of 1950," reports *Hardware Age*. Though they point out there will be some shifts in volume sources. Since prices are higher, the number of units sold probably won't increase in spite of higher dollar volume.

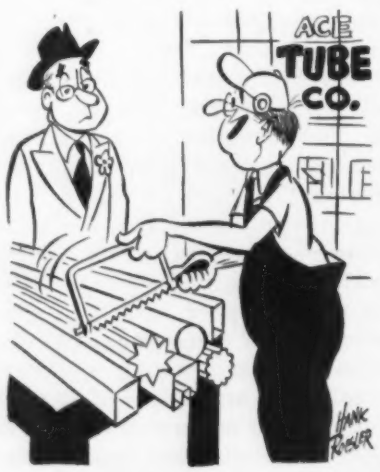
Scare buying at the retail level has largely tapered off. Ready cash of a lot of buyers has been spent, and credit restrictions are providing some brake to spending. But most consumers just aren't as sure as they were a few months ago that there are shortages around the corner. They, too, see the big stocks in showrooms.

Standard Models Coming

Manufacturers are still bringing out new models, although there is a definite trend toward standardization. Appliance makers are leading the move toward fewer and more standard models, but are continuing to aim at high, medium and low price markets.

Some firms are beginning to use substitute materials and many more are planning to do so. However, this won't show up much at the retail level for several months. The exception is the toy industry where a lot of metal has already been replaced by plastic. Christmas toys, which are selling now, have resumed their trend toward plastic.

Some sources believe that hardware and appliance manufacturers would have found it advisable to slow their breakneck pace by the middle of this year—even if material restrictions hadn't forced them to do so sooner. Present stocks seem to bear them out.



"The little woman would like some cookie cutters."

Army Breaks J & L Deadlock

Pittsburgh—An Army directive ended the 12-day shutdown of Jones & Laughlin Steel Corp.'s Pittsburgh plant last week, and the company was gradually getting back into production this week. Ingot loss may reach 70,000 tons.

Brig. Gen. Andrew McIntyre ordered the Monongahela connecting railroad, a subsidiary of J. & L., to increase the wages of 500 Brotherhood of Railroad Trainmen 12½¢ per hr to break a deadlock. The company had offered 6¢ an hr and an incentive bonus. The BRT originally demanded 35¢ per hr.

Copper Tax May Go Out

Washington—Suspension of import duties on copper for 2 years—provided domestic prices do not drop below 24¢ per lb—is slated for approval in the House.

The legislation, approved by the House Ways and Means Committee, requires the President to reimpose the duty within 35 days if the price goes below 24¢. Similar legislation is under consideration in the Senate, but no action is expected until late April.

A. C. F. Car Backlog at 31,238

New York—American Car & Foundry Co. has received orders for 3250 additional freight cars. This brings the company backlog to 31,238 cars as of Mar. 15.

Tide of Government Orders Big Chance for Small Business

"Can You Make It?" brings prime, subcontractor together.

New York—A tide of defense awards to prime contractors has flooded from government procurement agencies during the past 8 months offering a major source of new business for small manufacturers stymied by restrictions.

Total firm orders during 8 months from July 1950 reached $19.7 billion with $7.7 billion in awards let during January and February.

The big share of subcontractors in this business is emphasized by a Cleveland survey showing prime contractors with $181 million in ordnance awards subcontracted $95 million of this, much to small business.

Bulk of government awards, $16.3 billion went for hard goods largely affecting metalworking industries. Balance of orders were for soft goods, subsistence, and facilities.

THE IRON AGE "Can You Make It?" feature, presented for the first time last week (THE IRON AGE, Mar. 22, 1951, p. 92), aims to help purchasing agents quickly find competent subcontractors and small manufacturers to get idle machines running for defense.

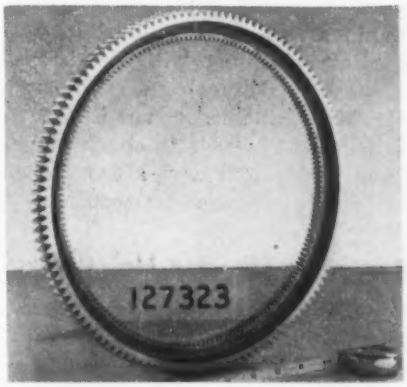
Quick Contact: Prime and Subcontractors

To the prime contractor with a difficult part to subcontract, and to the small manufacturer looking for defense work for his machines, "Can You Make It?," a weekly editorial feature of THE IRON AGE, offers an opportunity for quick contact.

If you are a prime contractor, send us a picture or simple inked sketch of the part you want subcontracted, part number, material and fabrication, approximate size, tolerances, quantity required, and your address. Mail to

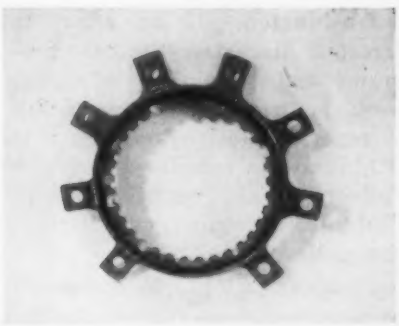
"Can You Make It?" Editor
The Iron Age
100 East 42nd St.,
New York 17, N. Y.

Prospective subcontractors are urged to contact directly the prime contractors whose parts are described.



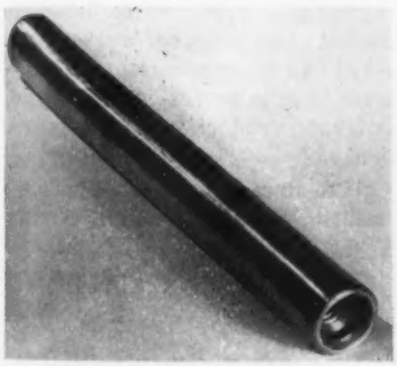
Iron Age SC 8

Machine from Nitralloy forging
Hardness: Case, Rockwell 15-N, 91.5 min; core, Rockwell C 25-32
Finish: 32 microinches, RMS
Backlash: 0.002 in.
Requirements: 100 per month
Part No. 127323, Purchasing Dept. Curtiss-Wright Corp., Caldwell, N. J.



Iron Age SC 7

Machine from AMS 6322 forging.
Max. diam: 7 in.
Nitrided all over.
Core Hardness C26-32.
Case Hardness 15N82 Min.
Finish: 16-20-50 Microinches.
Tolerances: 0.001 to 0.004.
Requirements: 570 to 1190 per month.
Part No. 135780, Subcontracting Dept., Wright Aeronautical Corp., Wood-Ridge, N. J.



Iron Age SC 10

Machine from AMS-4625 bronze bar stock.
Tapped hole, centerless grinding.
Max. size: 5½ in. x ⅝ in.
Tolerances: 0.0005 to 0.030 in.
Finish: 25 microinches.
Requirements: 570 to 1200 per month.
Part No. 134732, Subcontracting Dept., Wright Aeronautical Corp., Wood-Ridge, N. J.

Iron Age SC 9

Machine from Nitralloy forging
Hardness: Case, Rockwell 15-N, 91.5 min; core, Rockwell C 25-32
Finish: 32 microinches, RMS
Backlash: 0.002 in.
Requirements: 100 per month
Part No. 127324, Purchasing Dept., Curtiss-Wright Corp., Caldwell, N. J.

Iron Age SC 11

Machine from AMS-6260 forging.
Max. size: Approx. 6¾ in. by 1¾ in.
Tolerances: 0.001 in. to 0.010 in.
Carburized and hardened.
Core hardness Rockwell C32-40.
Case hardness Rockwell C60-63.
Finish: 8-16-32 microinches.
Requirements: 290 to 500 per month.
Part No. 133995, Subcontracting Dept., Wright Aeronautical Corp., Wood-Ridge, N. J.

CONTROLS DIGEST

Funds for Greek Manganese

Washington — ECA has advanced $119,000 to two Greek mining firms for exploration for manganese on the island of Samos and in the Granitis section of the Greek mexx mainland. The contractors will contribute 30 pct of the required cost. The ECA advance will be repaid to the U. S. in shipments of manganese to the strategic stockpile.

Mills to Report Over-Buying

Washington — In an effort to forestall disruption of steel programs and schedules, NPA last week instructed steel producers to report excessive buying under DO-97 ratings scheduled for June delivery if the quantities seem likely to upset normal distribution patterns.

Producers were also instructed to ignore until further notice DO-97 rated orders for maintenance, repair and operation in connection with the freight car, shipping vessels, and steel shipping container programs. Steel for these purposes has already been provided for under special set-asides.

OPS Plans Scrap Inspections

Washington—Teams of iron and steel scrap inspectors will be formed to make checks of scrap shipments at rail yards, said Edward P. Morgan, Director of Enforcement, Office of Price Stabilization.

The teams will take pictures of cars and contents, record car numbers and names of shippers for later tallying with the books of both consignees and shippers. Mr. Morgan guessed that the OPS squads will be able to check thousands of freight cars a day. Violators are promised prosecution.

Ready New Tungsten, Moly Orders

Washington—New orders affecting distribution of molybdenum and tungsten are being readied for issue by NPA. One would allocate molybdenum according to end uses, and regulate distribution of molybdenum metal wire, rod, powder, and sheet.

The other proposed order will coordinate the present tungsten allocation program with the proposed steel alloy allocation program, under which producers would report monthly melting schedules. Tungsten users will be required to submit similar monthly usage schedules for basing future allocations.

Industry Controls This Week:

NPA Orders

DO-97, Zinc use — Rating may be extended to use in some printing processes.

M-2, Tires and tubes—Limits second quarter deliveries to 75 pct of first quarter 1951 deliveries.

M-17, Electrical goods—Sets percentage order ceilings for rigid conduit, electrical and steatite ceramics, electronics tubes, fixed composition resistors. Effective Mar. 23.

Ease Defense Housing Controls

Washington — The government moved this week to ease residential building controls in critical defense areas.

Two agencies—the Federal Reserve Board and the Housing and Home Finance Administration—agreed to relax all housing credit regulations applying to housing needed for defense workers or military personnel. "Critical areas" are to be designated by the Defense Production Administration.

DPA already has eased housing credit in areas surrounding Aiken, S. C., and Paducah, Ky., where atom bomb plants are under construction.

Word on PAD Priorities by Apr. 16

Washington—Petroleum Administration for Defense has promised to let oil and gas operators know by Apr. 16 what help they might expect in getting priorities for third-quarter oil country tubular goods.

Under M-46, operators who

Defense Contracts to Metalworking Industry

Selected Contracts, Week of March 26, 1951

Item	Company
Inverters	Jack & Heintz Precision Ind., Cleveland
Truck spare parts	Queen City Mfg. Co., Cincinnati
Compressors systems	Cornelius Co., New Brighton, Minn.
Projector parts	Bell & Howell Co., Chicago
Survival kits	Beinap & Thompson, Chicago
Kits	Consolidated Vultee, Aircraft Corp., Fort Worth, Tex.
Gun turret	Bachman Wholesale Co., Rochester, N. Y.
Repair parts	Leland, Brinckerheff & Co., Washington
Pump parts	Allis-Chalmers, York, Pa.
Hydraulic jacks	Dayton Aircraft Products Co., Dayton
Interphone systems	Radio Corp. of America, Camden, N. J.
Bomb slings	Waco Aircraft Co., Troy, Ohio
Radar receivers	Webster Chicago Corp., Chicago
Spare parts	Douglas Aircraft Co., Inc., Santa Monica, Calif.
Spare parts	Fairchild Engine & Airplane Co., Hagerstown, Md.
Spare parts	Lockheed Aircraft Corp., Burbank, Calif.
Compass	Kollsman Instrument Div. of Square D Co., Elmhurst, N. Y.
Transmitters	Bendix Aviation Corp., Teterboro, N. J.
Pumps	Borg-Warner Corp., Bedford, Ohio
Spare parts	Bucyrus-Erie Co., Elyria, Ohio
Bunk beds	Harris Hub Bed & Spring Co., Cicero, Ill.
Machinery and controls	Allis-Chalmers Mfg. Co., Milwaukee
Spare parts	Chance Vought Aircraft Div., United Aircraft Corp., Dallas, Tex.
Indicator	Eclipse Pioneer Div., Bendix Aviation Corp., Teterboro, N. J.
Signal generator	Hewlett-Packard Co., Palo Alto, Calif.
Pump	Vickers Inc., Detroit
Tachometer	General Electric Co., Philadelphia
Truck, tractor	Mack Mfg. Co., Plainfield, N. J.
Trucks	Mack Mfg. Corp., Washington
Truck dump	International Harvestor Co., Washington
Brake assemblies	Wagner Electric Corp., St. Louis
Steering brake ass'y.	Federal Motor Truck Co., Detroit

want priorities assistance for third-quarter deliveries of casing, tubing and drill pipe must file inventory reports with a statement of programmed needs.

Production of oil country goods dropped from 150,000 tons a month in 1950 to a rate of 130,000 tons for the first quarter of 1951. PAD estimates 157,000 tons a month will be required.

New Cuyuna Range Mine Has 20 Million Tons 40 Pct Iron Ore

Minneapolis—A field containing 20 million tons of iron ore with a 40 pct content may prove suitable for exploitation, depending on concentration tests now being conducted by the Pacific Isle Mining Co., of Hibbing, Minn.

With 55,000 tons of 54 pct ore already mined and another 100,000 tons of high-grade ore left, the lid has merely been lifted on the large low-grade deposits. The mine is on the Cuyuna Range, west of the Mississippi, a mile from Randall, Minn.

Lead to New Projects?

This was disclosed to THE IRON AGE by Dr. G. M. Schwartz, of the University of Minnesota and director of the state's geological survey. He said demand for iron ore may make concentration of this lower grade ore feasible and may lead to similar projects on the Cuyuna Range. Mining out the remaining 100,000 tons of high-grade ore has been halted by ground conditions but will be resumed later this year if market conditions are favorable.

Dr Schwartz said the 54 pct ore has a high moisture content and a 10 pct silica content which runs about 2 pct above the Mesabi average. Stripping operations at the Randall pit began on Jan. 5.

Earth Movers Meet Apr. 10-11

Peoria, Ill.—The second annual Earthmoving Industry Conference will be held here Apr. 10 and 11 with the Central Illinois section of the Society of Automotive Engineers as sponsors.

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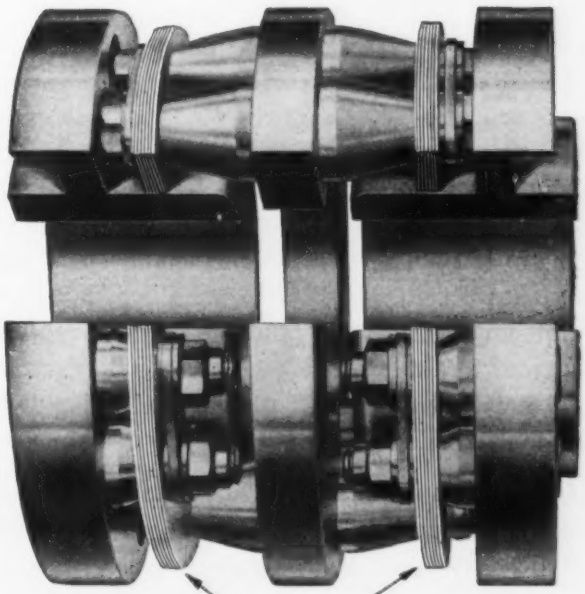

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WL can supply "B" No. 3X in bars, discs, flats or forgings heat treated to your exact hardness specifications. And this unusual HY-TEN alloy steel can be machined even when hardened as high as 477 Brinell (48 Rockwell "C")!

This unusual property—*machinability at high degrees of hardness*—makes this steel particularly well suited for parts which are apt to distort badly in the treating operation. This makes possible savings in handling and set-up time and finishing operations by putting parts into service without further treatment. A smoother finish is obtainable at almost any degree of heat-treated hardness than is possible with standard alloy steels.

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Suggests Shift to Multi-Fuel Burners at Spring ASME Session

Atlanta, Ga. — The emergency period vagaries of fuel costs and availability make it advisable for users of industrial steam generating equipment to switch to multi-fuel burners to get maximum economy and flexibility of operation, it was suggested at the spring meeting of the American Society of Mechanical Engineers by William H. Decker, of Sinclair Refining Co.

He said multi-fuel burners capable of burning any fuel would make manufacturers "practically independent of the effect of strikes and shortages." He pointed out that in a few special cases the extra cost of a multi-fuel burner would not be justified. Fuel costs average 85 to 90 pct of total costs of steam or energy produced.

Howard E. Degler, Marley Co., Inc., told the ASME that, with water use double what it was 10 years ago and demand rising, economical water-cooling equipment for industrial re-use of water was of "vital importance." He said industry's requirements are often more than 300 lb of water to the pound of finished product.

More Castings for Defense

Chicago—The nation's 250 steel foundries are heavily engaged in producing castings for defense programs, said F. Kermit Donaldson, executive vice-president of the Steel Founders' Society of America.

Volume of steel castings for 1951 will greatly exceed the 1,405,000 tons produced last year. A large part of production now is going into steel mill expansions and government programs, particularly for freight cars and locomotives. Castings for military tank programs are expected to comprise a substantial portion of 1952 business.

Mesta Backlog $60 Million

Pittsburgh — Mesta Machine Co.'s backlog of unfilled orders is more than $60 million.

Must Use More Pig Iron To Offset Lack of Scrap, Says Weir

Eastern mill will go on National's building list as soon as possible.

Pittsburgh — Expanding steel must prepare to use more pig iron in melts to offset lack of scrap iron and steel. Existing and anticipated supplies of scrap will not support expanded capacity on the previously "normal" basis, said E. T. Weir, National Steel Corp. chairman, in his annual report.

He indicated National's projected Paulsboro, N. J., mill will have more blast furnaces than most existing mills in proportion to capacity, which has been estimated at from 1.5 to 2 million tons.

Weirton Steel Co. will build a 1200-ton blast furnace to make a total of four at the plant.

Final plans for the eastern mill have not been made, but it will be placed on National's construction schedule "at the earliest appropriate time." Weir said the site was selected with an eye to the eastern, southern, West Coast, and export markets. Labrador-Quebec iron ore will reach the plant via the St. Lawrence River and Atlantic Ocean. The 2400-acre site is at a point where the Delaware River is 40 ft deep.

Oxygen Plant Running

Weir revealed that the oxygen plant at the Weirton Steel Co. plant has been in operation the last several weeks. Design changes delayed completion.

Weir again assailed tax allowance for depreciation. He said National's provision for depreciation and depletion in 1950 of $20,002,683 included $5.5 million accelerated depreciation. This compares with provision in 1949 of $25,021,857, including accelerated depreciation.

National Steel net earnings, employment, and wage payments in 1950 established new records. Earnings were $57,814,974, compared with $39,311,269 in 1949. Sales were $537,024,673.

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↓ One of many steps in the inspection of Perkins' Aircraft Engine Gears

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Canadian Scrap Supply Tight

Toronto—Canadian steelmakers with a record of 3.3 million-ton output in 1950, face a steel scrap shortage. Price controls were removed from scrap a year ago and tight export restrictions have slowed movement of scrap out of the country.

An effective program to bring out more scrap must consider price incentive, costs, and maintenance of regular channels of trade, according to Norman Levy, secretary of the Canadian Secondary Materials Assn. Outlining Canada's development of basic industries, Mr. Levy stressed the need for control of inflationary pressures.

Plan Foundry Manpower Study

Washington—A study of defense manpower needs of the iron and steel foundry industry will get underway by the Bureau of Labor Statistics on Apr. 1.

Associations representing the gray iron, malleable iron, and steel foundry industries will aid BLS. Association members will be asked to supply information needed to work out requirements and develop a program to prevent cutbacks in production because of lack of manpower.

Battelle Tackles Enameling

Columbus, O.—A scientific attack on the problems of improved porcelain-enameling of steel products is being made by the Battelle Memorial Institute under the sponsorship of 17 separate concerns. Cobalt, manganese, nickel and other metallic oxides are being studied in particular to determine their effects on stability, "wettability" and other properties.

Perfect Shipping Campaign Set

Washington—Prevention of loss and damage to freight is the objective of the 1951 Perfect Shipping Campaign being conducted during April by the 13 regional Shippers Advisory Boards. Savings in time, materials and manpower will result from proper protection of goods in transit.

Expansion of Canadian Steel Industry Following U.S. Pattern

Raw materials problems grow . . . Meet coal, iron ore, scrap difficulties.

Toronto — Canadian steel expansion programs are following the pattern of expansion programs in the United States, according to G. W. Bruce, general superintendent of the Hamilton Works, Steel Co. of Canada, Ltd.

Addressing members of the Canadian Secondary Metals Assn. in Toronto last week, Mr. Bruce cited programs of Algoma Steel, Dominion Foundries & Steel, Atlas Steel, Dominion Steel & Coal, and the Steel Co. of Canada. Production at the latter will reach 1,900,000 ingot tons a year by 1952, an increase of 700,000 tons over 1950.

Increased production has raised raw material problems. High-grade coal seams are being depleted. Larger limestone charges to offset high sulphur and ash in coke have resulted in retarded blast furnace production.

Use of low-grade ores has widened interest in beneficiation processes and development of high-grade ore deposits in Canada such as Steep Rock.

Terrific demand for scrap, ruled by a sellers' market, has lowered the quality of scrap. While new methods of scrap handling—baling and briquetting machines—have helped, the percentage of well - segregated and prepared scrap has decreased yearly, Mr. Bruce said.

To offset scrap problems, open-hearth operators have increased box size, widened door size and raised furnace roofs—often resulting in inefficient melting. Bulky scrap, Mr. Bruce pointed out, retards fast melting and lowers furnace yield.

Material Handling Conference

Chicago — Fifty-eight materials handling experts will take part in the joint materials handling conference and exposition scheduled for the Amphitheatre, Apr. 30 to May 4.

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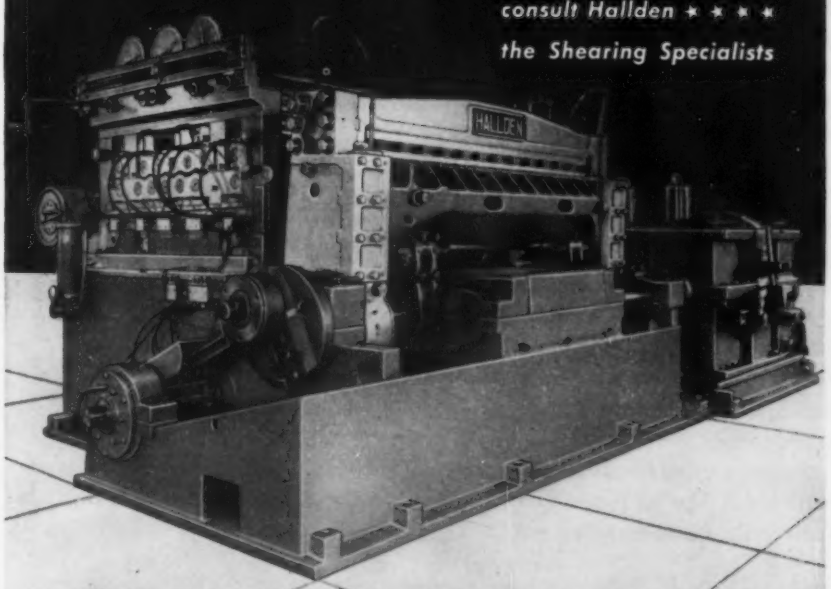

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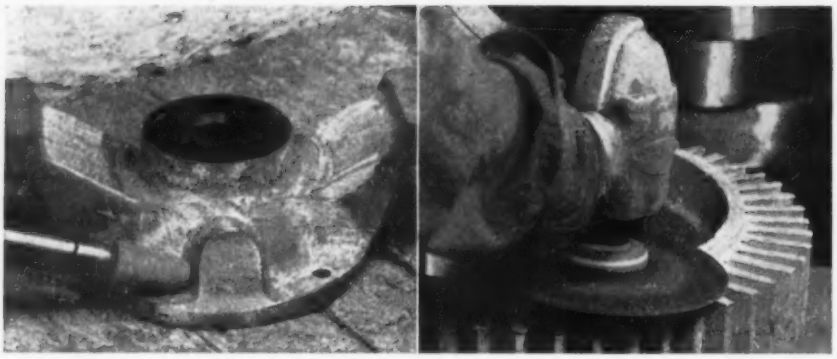

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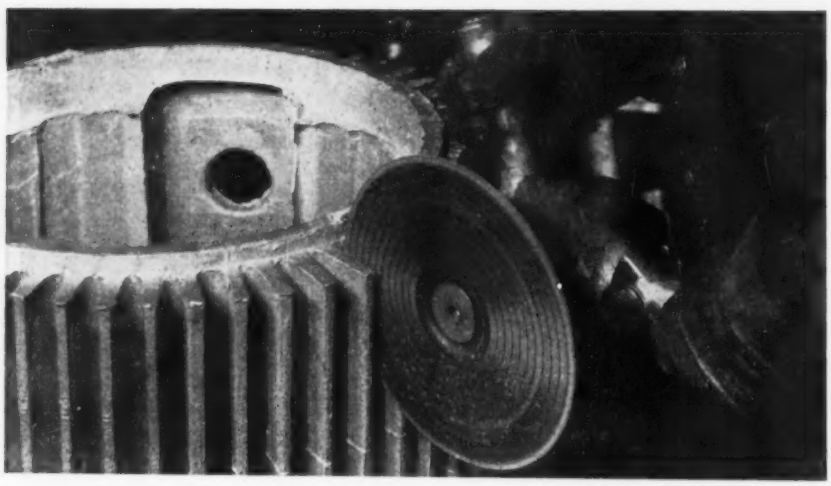

Absolute cleanliness is a special requirement for electric motors used in dairies and food-processing plants. Inside and out, these motors must be smooth and clean, completely free from nicks or blemishes that might serve to hold dust or dirt. Every motor is subject to frequent, rigid inspections by various health and sanitation authorities.

In The Master Electric Company foundry, Buckeye air grinders are used in the preliminary stages of production on Master Sanitary motors. On bearing housing castings, for example, a Buckeye pencil grinder, equipped with a special extension collet, gets into every curve and crevice of these castings, assures a perfectly smooth, clean job.

Cleaning the tops, bottoms and the numerous fins on castings for Master Fancooled motors is another Buckeye air tool job in this foundry. Despite the limited space between the fins on these castings, flexible, easy-to-handle Buckeye vertical sanders have cut the time required for this difficult cleaning operation.

Buckeye grinders and sanders do the difficult jobs in less time, at lower cost. We'd like to prove that . . . in your plant . . . on your job. A Buckeye Tools Field Representative will gladly arrange a test, without obligation.

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Steel Founders' Awards Made

Chicago—Contributions to the steel casting industry were recognized this week with announcement of medal awards by the Steel Founders' Society of America.

Thomas H. Shartle, president, Texas Electric Steel Co., received the Lorenz Memorial Gold Medal. Paul H. Stuff, chief metallurgist, Ross-Meehan Foundries, received the Society's Technical and Operating Medal for 1950. G. A. Lillieqvist, research director, American Steel Foundries, received the annual Steel Foundry Facts award.

Rod Mill for Future Security

Kokomo, Ind.—Continental Steel Corp.'s new $5 million continuous rod mill now being installed should be in production by the end of this year. The mill is expected to improve the company's competitive position if demand for sheets declines in the future. Later, if they are unable to produce sheets profitably on their semi-hand operated sheet mill, ingots may be diverted to the new rod mill to produce wire products.

Nickel Deliveries Rise in 1950

New York—Deliveries of nickel in 1950 were 22 pct higher than in 1949, said Dr. John F. Thompson, chairman and president of the International Nickel Co. The firm's net earnings last year were $48,765,849. To expand the supply of nickel, Inco began operating an additional blast furnace at its Coniston smelter and another reverberatory furnace at its Copper Cliff smelter.

Philco Buys New Plants

Philadelphia—Philco Corp. has acquired 175,000 sq ft of new plant space on a 70-acre plot at Bedford, Ind., about 65 miles southwest of Indianapolis. There are rail sidings along each of the three closely adjoining buildings. Philco plans to use the space for government work for the present and plans on switching over to civilian production.

STEEL CONSTRUCTION NEWS

New York—February bookings of fabricated structural steel, as reported to the American Institute of Steel Construction, totaled 200,788 tons. While this is the lowest booking figure reported since June, 1950, it does reflect the ninth consecutive month in which the contracts awarded have exceeded 200,000 tons, for an average of 249,229 tons for the nine months period, or at a rate of 2,991,000 tons per year.

February shipments of 154,783 tons were also lower than January, but for the first two months of the year have exceeded the average month of 1950.

The backlog (tonnage available for future fabrication) for the next four months only amounts to 830,255 tons, and beyond that period another 1,398,240 tons of work stands on the industry's books, or a potential volume of work ahead of 2,228,495 tons, as compared with 2,136,865 tons at January 31st.

Following is the complete tabulation of bookings and shipments:

	Estimated Total Tonnage for the Entire Industry		
CONTRACTS CLOSED	1951	1950	Avg. 1936/1940
January	286,178*	119,317	107,578
February	200,788	117,664	96,280
Totals	486,966	236,981	203,858
SHIPMENTS			
January	176,862*	135,253	92,578
February	154,783	129,628	88,626
Totals	331,645	264,881	181,204
TONNAGE AVAILABLE FOR FABRICATION			
Within the next four months (To June 30, 1951)	830,255	565,428	304,277
After the next four months (From July 1, 1951)	1,398,240	249,463	97,178

*Revised.

Fabricated steel awards this week included the following:

1100 Tons, Des Moines, Solar Aircraft Co. bldg., to Pittsburgh Des Moines Steel Co.

1020 Tons, Bradley, Ill., Armour and Co. pharmaceutical bldg., to Ingalls Iron Works.

1000 Tons, Decatur, Ala., Chemstrand Corp. plant, through Daniels Construction Co., to Truscon Steel Co., Birmingham.

450 Tons, Des Moines, Meredith Printing Co. warehouse, to Pittsburgh Des Moines Steel Co.

205 Tons, Pensacola, Fla., Gulf Power Co., power plant, to Truscon Steel Co., Birmingham.

AIEE Names Bohn for Lamme Award

New York — Donald I. Bohn, chief electrical engineer of the Aluminum Co. of America, has been named for the 1950 Benjamin J. Lamme medal by the American Institute of Electrical Engineers for work in developing electrical equipment used in production of aluminum. The award will be presented at a meeting of the AIEE in Toronto June 25-29.

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Your free copy of this brand new book brings you full, up-to-date details on all types of upward-acting doors for every need—including specifications on door sizes, headroom requirements, opening preparation, and so on. It shows you *how and why* the space-saving upward action of Kinnear Doors gives you highest efficiency at every opening.

In addition to the rugged, all-metal Kinnear Rolling Door—featuring the famous Kinnear-originated "curtain" of interlocking slats—it presents other Kinnear upward-acting doors. These include the sectional-type Kinnear RoL-TOP Doors (wood or all-metal), Kinnear Bi-Fold Doors (wood or all-metal), featuring two sections that "jacknife" upward and out of the way, and Kinnear Steel Rolling Fire Doors, the interlocking slat doors with special features for maximum fire safety. Kinnear Steel Rolling Grilles for protection that does not block light, air, vision, or sound are also shown. Write for this new Kinnear Catalog today!

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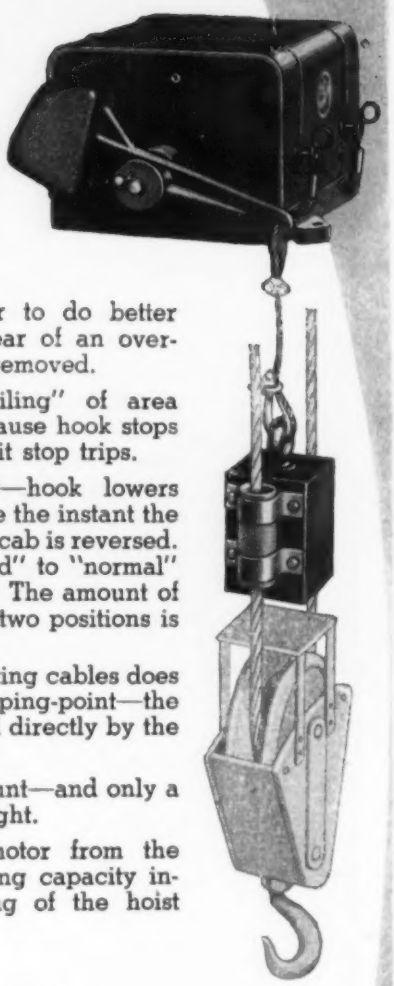
EC&M YOUNGSTOWN SAFETY LIMIT STOP

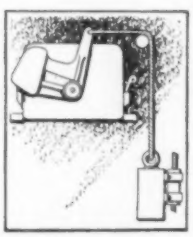
Eliminates Fear of Overtravel -- Permits High Lifts

This Safety Limit Stop offers protection for men and equipment saves time and reduces costs.



1. Enables the operator to do better work, because the fear of an overhoisting accident is removed.
2. Raises "working - ceiling" of area served by crane, because hook stops quickly when the limit stop trips.
3. Re-sets automatically—hook lowers out of the danger zone the instant the hoist-controller in the cab is reversed. Transfer from "tripped" to "normal" connections is rapid. The amount of travel between these two positions is low.
4. Stretching of the hoisting cables does not affect the tripping-point—the Limit Stop is operated directly by the hook block.
5. Compact, easy to mount—and only a single suspended-weight.
6. Disconnects hoist - motor from the line—high interrupting capacity insures positive opening of the hoist motor current.

Youngstown Safety Limit Stops are built for both a-c and d-c hoist motors and are easily applied to either new or old cranes. As a check against human error, these limit stops have no equal. Write for your copy of Bulletin 1032.



Optional Style—with offset weighted-arm which eliminates intermediate sheaves when Stop is not mounted directly over crane hook-block. Available on all sizes of EC&M Youngstown Limit Stops.

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Jet Research Needs Cold Air

Cleveland—"Cold" equivalent to 30 million lb of ice every 24 hours is produced by the largest of four cold-making installations at NACA's Lewis Flight Propulsion Laboratory. All this frigidity is needed in the development of jet engine planes that must be able to fly at 50,000 ft and higher and function at temperatures of 65° below zero.

To simulate conditions of high altitude flight Lewis engineers depend on refrigerated air. Abe Silverstein, research director, reported progress in turbine cooling and development of substitutes for strategic materials.

Seek Aid for New Indian Mill

London—Completion of India's iron and steelmaking expansion plans will leave a gap of half a million tons between capacity and the country's needs. Government assistance is being sought to finance a new plant with about 600,000 tons annual capacity.

Production of billets has been recommended for the new plant to meet the excess capacity of rolling mills. Finished steel consumption in the next 3 years is estimated at 6 million tons. Finished steel production in 1949 was 927,000 tons.

New Devices Save on Corrosion

New York—The seventh annual conference of the National Assn. of Corrosion Engineers was held here recently in the Hotel Statler. F. L. LaQue, of International Nickel Co.'s research division, reported that huge savings by reduction of corrosion losses were being effected by new devices. More than 43 papers were presented and over 100 products exhibited.

Minchin Heads DTA Railroad Div.

Washington — Appointment of G. H. Minchin as director of Defense Transport Administration's Railroad Div. has been announced. Mr. Minchin is senior vice-president of the Atchison, Topeka & Santa Fe R.R. Co., and president of the Illinois Northern R.R.

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The Oakite *CrysCoat* Process may be just what you're looking for. With minimum equipment . . . in minimum time . . . at minimum cost you can (1) clean metal surfaces and condition them for painting; (2) improve the adhesion of paint to metal; (3) prevent corrosion before metal is painted; (4) localize corrosion under paint if finish is broken.

The Oakite *CrysCoat* Process Offers These Extras:

1. **Eliminates operations . . . uses less equipment**
2. **Cuts operating time**
3. **Uses less chemicals for cleaning and conditioning**
4. **Reduces heating costs**
5. **Saves cost of expensive acid-proof tanks and equipment**
6. **Saves cost of frequent descaling and desludging**
7. **Drag-out costs are less because of low original cost of solution**
8. **Saves paint**
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FREE . . . illustrated folder describes the Oakite *CrysCoat* Process for use in before-paint-treatment of steel, aluminum sheet and castings, zinc die castings and galvanized surfaces. If you are engaged in the fabrication of civilian goods or the speedy production of defense orders—send for Folder F7642.

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Stronger, Faster, Cheaper

Countless small parts usually made by conventional turning processes — by stamping, drawing, casting or molding — can be made *better . . . stronger . . . cheaper* by *cold-heading* and roll threading.

Machining of Cold-Headed Parts is hardly ever necessary because shank and head dimensions can be held to very close tolerances. Rolled threads are produced to American Standard dimensions.

Here are just a few of the many parts formed or roll threaded . . .

Screws	Plastic Inserts	Stems
Bolts	Thumb Screws	Arms
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Rivets	Small Gears	Prongs
Rods	Tongue—Clevis	Points
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Single or multiple secondary operations can be performed on cold-headed parts to produce special characteristics required to fit the part for its particular application. These secondary operations include drilling, tapping, milling, shaving, flattening, notching, flanging, trimming, serrating, bending, off-setting, slotting, fluting, swaging, knurling, pointing, heat treating, plating and finishing.

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publications

Continued from Page 34

ment, and easily withstands loads up to 50,000 lb. *Monroe Co., Inc.*

For free copy insert No. 8 on postcard, p. 35.

Liquid Level Control

Reasons for using two bellows for control instead of the ordinary single bellows design are explained in a new 4-p. bulletin describing Autocon Tanktrol pressure operated pump controls that automatically maintain water levels in elevated tanks. Typical examples of the many application possibilities are shown, and the features that provide greater accuracy plus protection are fully detailed. *Automatic Control Co.*

For free copy insert No. 9 on postcard, p. 35.

Steel Building Products

A new 44-p. catalog contains product specifications, applications, prices, shipping and packaging data on a number of product lines, including: galvanized wall stack and accessories; galvanized furnace pipe and accessories; registers, grills and regulators; stove pipe and accessories; revolving, spinner and louver-type ventilators; Airtite wood burning heaters and Milcor portable bake ovens. *Inland Steel Products Co.*

For free copy insert No. 10 on postcard, p. 35.

Strain Gages

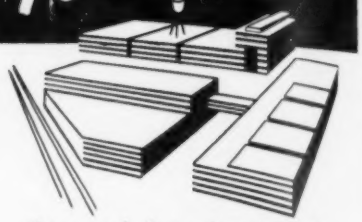
SR-4 temperature - compensated strain gages, which are only slightly affected by temperature variations within certain ranges when bonded to steel or aluminum, are described in a new 2-p. bulletin showing graphic performance and giving specifications for 10 new resistance wire strain gages. *Baldwin-Lima-Hamilton Corp.*

For free copy insert No. 11 on postcard, p. 35.

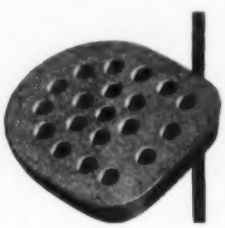
X-ray Equipment

A summary of x-ray film characteristics for industrial use is presented in a new 8-p. booklet describing x-ray units from 50 kv to 24 million v, equipment for film processing and radiation protection, materials for protective construction, and everything else needed for industrial radiography or x-ray

Are you running a 1951 Foundry?



Research has developed
ALSIMAG® Ceramic
STRAINER CORES
for you



Cleaner Castings
Fewer Rejects
Faster Production

ALSIMAG CERAMIC STRAINER CORES are smooth, hard, kiln-fired ceramic cores that fit into the gate of the mold. They strain the incoming metal and regulate its flow. They are tough and withstand all normal foundry pouring temperatures. Variety of shapes and sizes.

ALSIMAG CUT-OFF CORES save cut-off time by forming a weak joint between the riser and casting. Allow riser to be knocked off or cut off more easily. Cameron Cores made under Patent Number 2,313,517 sold to Meehanite Licensees only.

ALSIMAG GATE TUBES are hard, smooth ceramic tubes used to form a clean gate for the incoming metal. Keep castings cleaner.

FREE SAMPLES ON REQUEST. Samples of the above in stock sizes available on request. Samples to your specifications at reasonable cost. Test them in your own foundry. Write today for your samples.

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50TH YEAR OF CERAMIC LEADERSHIP
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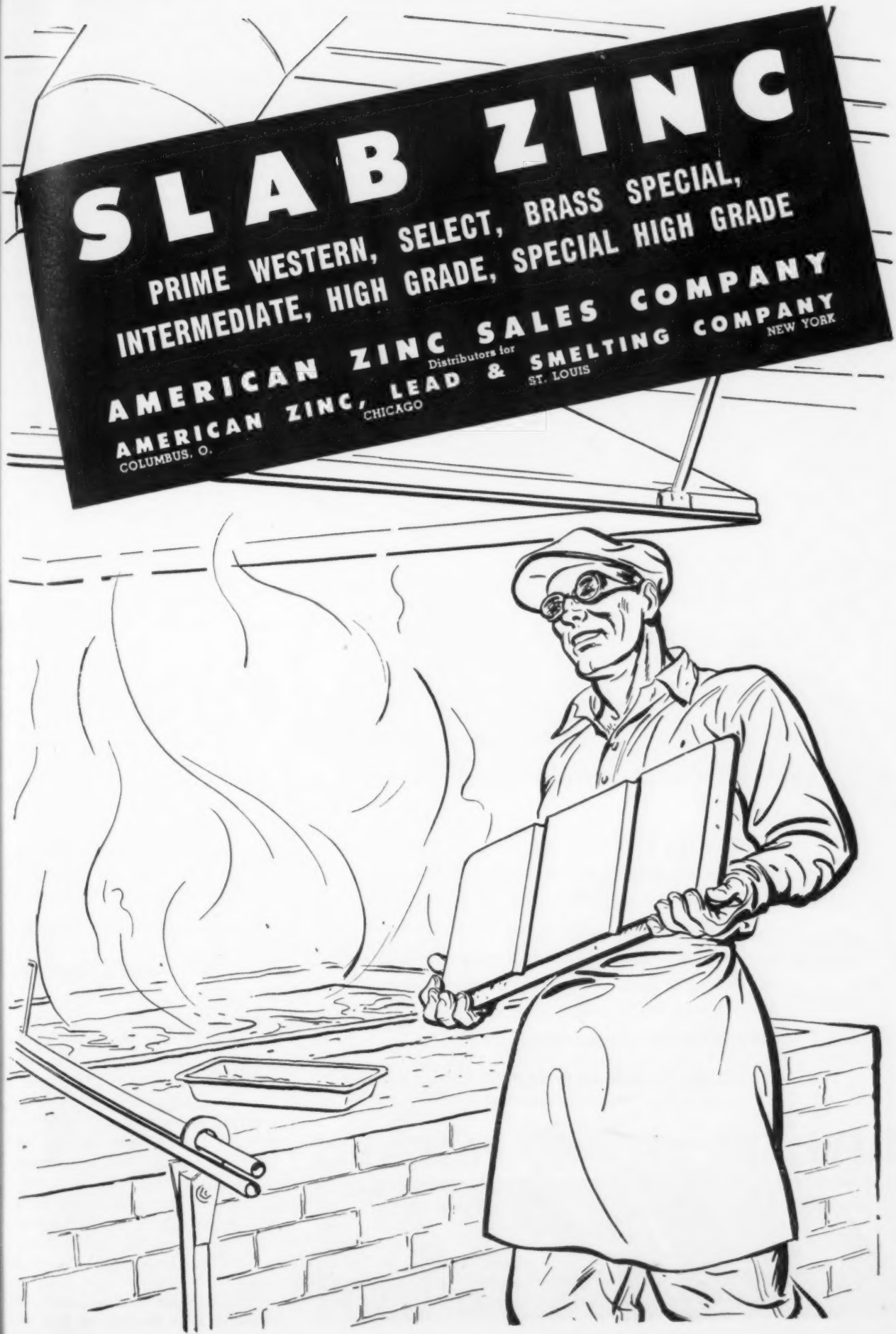
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Fast, economical production of your special design formed and threaded parts by Cleveland's cold extrusion methods

This may be a *better way* for you to procure those special integral parts that your engineers have designed. It pays you to search for a means to produce a *stronger* part, make it *faster,* or to *lower its cost.* Making it by our Kaufman Process—by single or double extrusion—may be the answer to one or all of these factors. Send blue prints and specifications. We'll tell you what we can do about it.

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CLEVELAND *Top Quality* FASTENERS

originators of the Kaufman DOUBLE EXTRUSION Process
Ask your jobber for Cleveland Fasteners

publications

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diffraction work. Also covered is this company's extensive facilities for prompt shipment of fresh films in all makes, types and sizes. *Picker X-ray Corp.*

For free copy insert No. 12 on postcard, p. 35.

Rubber Conservation

Aimed at conserving rubber and increasing production with present equipment, a new conservation maintenance plan has been developed which includes a handbook, wall charts and monthly publications. This data contains hundreds of illustrations and suggestions on how to select, install and maintain conveyer belting, flat transmission belting, V-belts, hose and packing, for assisting plants to prolong the life of industrial rubber products. *Quaker Rubber Corp.*

For free copy insert No. 13 on postcard, p. 35.

Hydraulic Presses

The latest hydraulic presses for the metalworking and allied fields are introduced in a new 12-p. catalog giving complete descriptions of H-P-M press operation for deep-drawing, forging die straightening, coining, shell-nosing and other jobs. Installation photos show actual production work. In addition, special application presses for straightening, riveting, forcing, baling and bending are reviewed in this booklet for production and plant management personnel. *Hydraulic Press Mfg. Co.*

For free copy insert No. 14 on postcard, p. 35.

Special Cleaning Problems

The application of specially designed airless blast equipment to 39 production cleaning problems, such as those encountered with automotive and railroad equipment, tubing and soil pipe, steel drums, sanitary ware, and asphalt tile, is described and illustrated in a new 28-p. brochure. The problems are taken from practically every major industry in the metals and metalworking field. Production figures in specific cases are also given. *American Wheelabrator & Equipment Corp.*

For free copy insert No. 15 on postcard, p. 35.

Resume Your Reading on Page 35

PRIME and SUB-CONTRACTORS
Working on Essential Government Contracts . . .

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BRASS and COPPER TUBING

Processed from the Basic Metal to the Finished Tubing in One of America's Finest Completely Integrated Mills!

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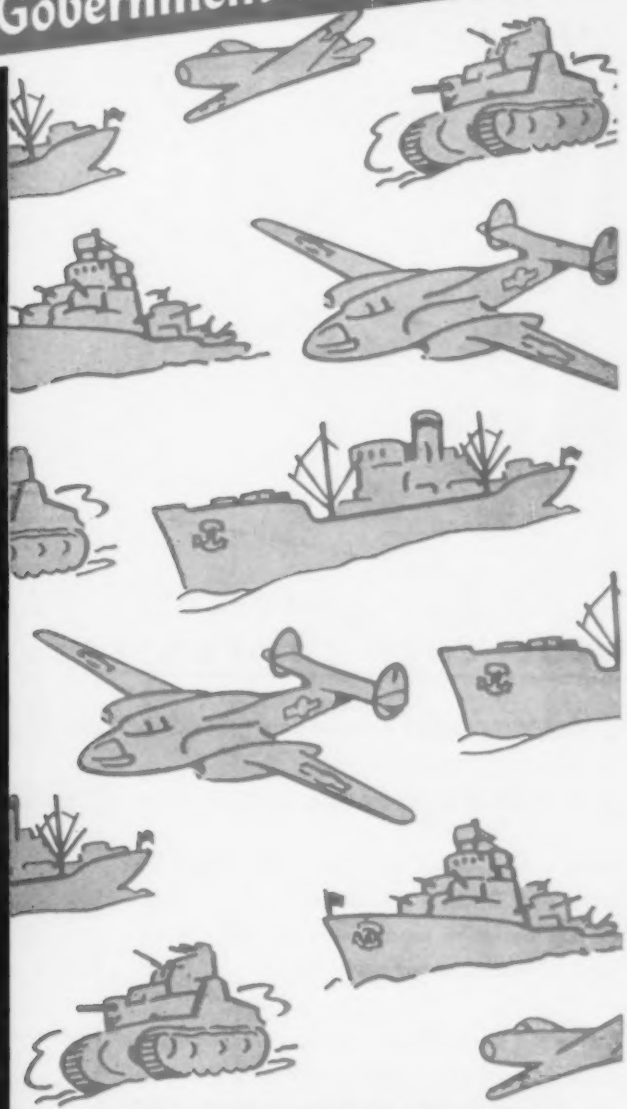

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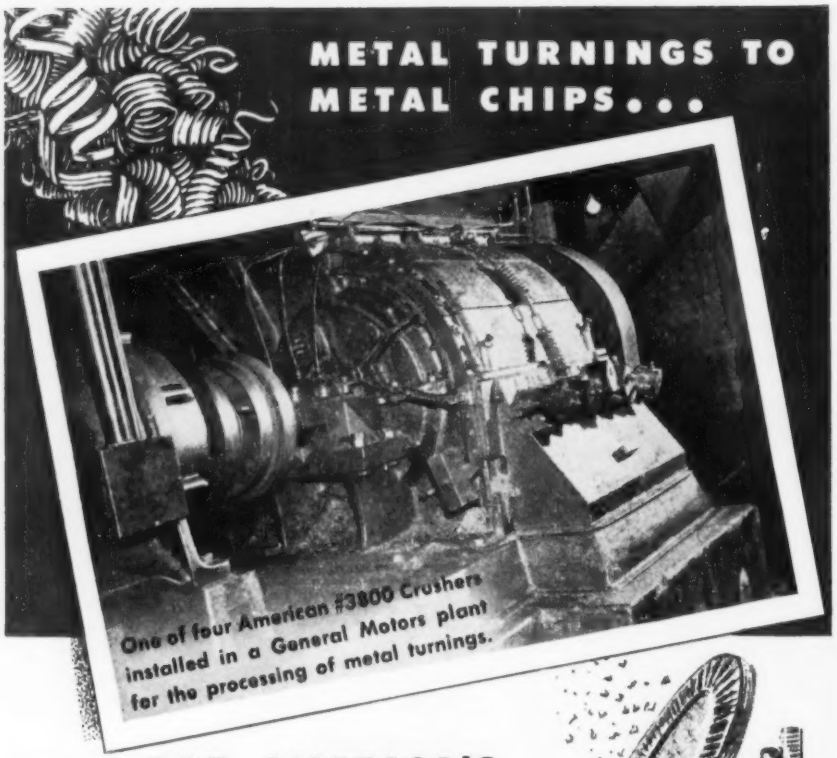
METAL TURNINGS TO METAL CHIPS...
One of four American #3800 Crushers installed in a General Motors plant for the processing of metal turnings.

...FOR AMERICA'S BLUE CHIP COMPANIES with

American METAL TURNINGS Crushers

WHY an AMERICAN installation makes Dollars and Sense:

These cost-conscious companies have long-since learned that American-crushed metal turnings quickly recover an initial American Crusher investment in these important ways:

$2 to $3 Extra Profit Per Ton: With higher scrap values for metal chips over ordinary machine shop turnings, a daily crushing capacity of only 2 tons will produce *$1200.00 per year in extra profits.*

Up to 80% Less Space: Reduction to metal chips solves many expensive handling and storage problems, and allows easy briquetting.

30-50 Gallons Per Ton Cutting-Oil Recovery: An important reclamation that adds new profits with an American Crusher installation.

Write for Bulletin "METAL TURNINGS CRUSHERS"

PROMINENT AMERICAN CRUSHER USERS

The users of American Metal Turnings Crushers read like a "Who's Who" of American Industry. Included are such names as:

GENERAL MOTORS • FORD
TIMKEN • ALLIS-CHALMERS
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WHEEL • CHRYSLER.

American

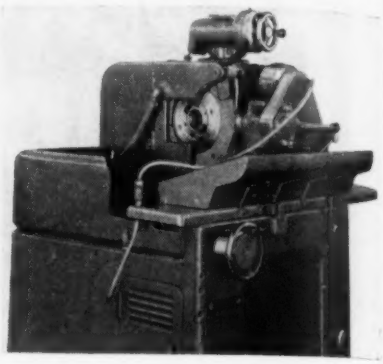
Originators and Manufacturers of Ring Crushers and Pulverizers

1439 MACKLIND AVE.
ST. LOUIS 10, MO.

production ideas

Continued from Page 38

the machine grinds with full size wheel is 6 in. This size permits 170° oscillation of the work head. The minimum size knife is 1½ in. diam with 145° oscillation. A 16-in. diam grinding wheel with 1-in. face, driven by a 3 hp motor, is standard equipment. An automatic grinding wheel feed includes a



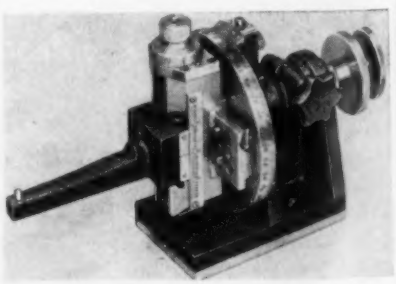
rapid infeed and retraction for wheel clearance and loading. Work head and slides are mounted on a swivel that permits the work to be swiveled about the center of oscillation. The angle of the two faces is obtained by setting two stops, one for each face, on the graduated scale provided on the swivel. A radius on the cutting edge is formed with the grinding wheel in forward position. *Landis Tool Co.*

For more data insert No. 29 on postcard, p. 35.

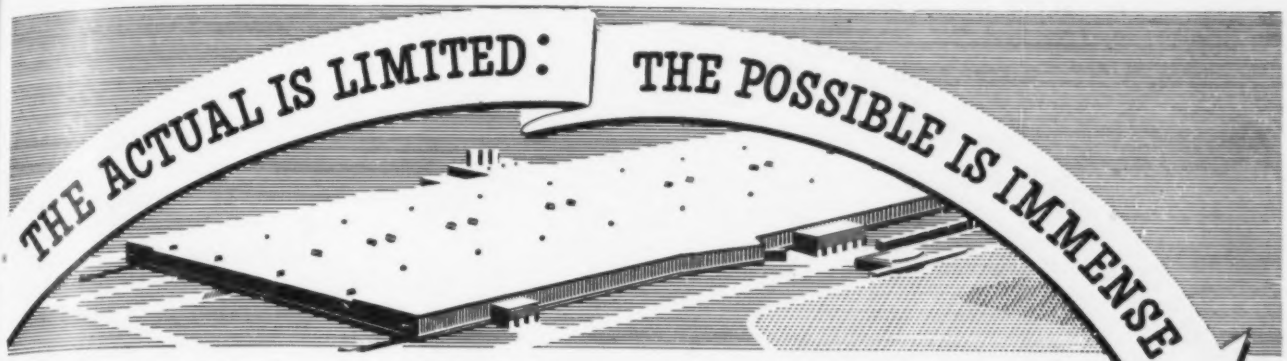
Wheel Dresser

For dressing angle-tangent-to-radius grinding wheel forms.

Setup time with the new Tangi-Matic dresser is said to be reduced to one-quarter the time usually required by experienced toolmakers,



as it eliminates Jo blocks, height gages, micrometers or other precision instruments. A built-in micrometer provides direct reading, rapid adjustments and accuracy



NEW LINCOLN PLANT CREATED BY INCENTIVE-INSPIRED CO-ACTION IN DEVELOPING POSSIBILITIES IN PRODUCT

© LE Co. 1951

DESIGNS THAT UTILIZE THE ECONOMIES OF WELDED STEEL ARE ALWAYS LOWER IN COST

1 There is a 2 to 1 advantage pound per pound between the cost of steel and iron.

2 Considering both strength and safety factors, there is an additional 4 to 1 advantage with steel.

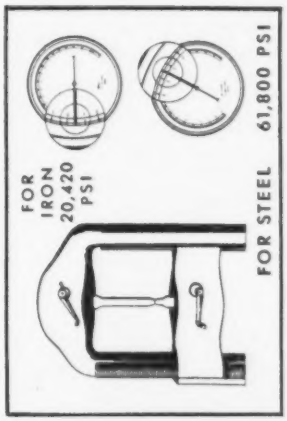
3 The design advantages are unlimited. Through origineering,* the designer is better able to locate the stronger materials in strategic areas, achieving maximum load-carrying capacity per pound of metal.

4 Production efficiency is greater. The shop can fabricate economically in any quantity . . . with a minimum of equipment and setup cost.

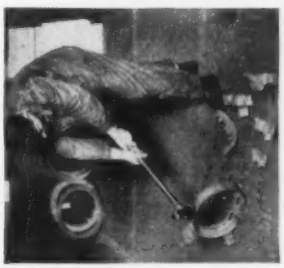
A Challenge to Industry

The greater potential economies possible with welded steel originate with design. To utilize the full benefits of steel requires new concepts in mechanics and appearance. Your Lincoln Welding Engineer can show you how to achieve these benefits in your designs . . . to build better products from less material at lower cost. Write The Lincoln Electric Co., Cleveland 1, Ohio.

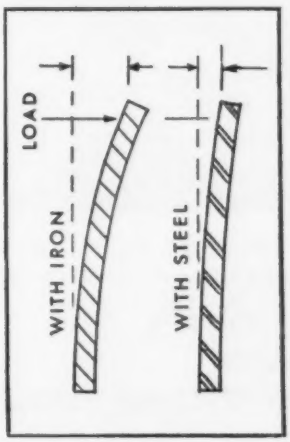
*Origineering . . . the science of originating new engineering designs.



Steel is 3 Times Stronger. *Has 4 times the resistance to fatigue.*

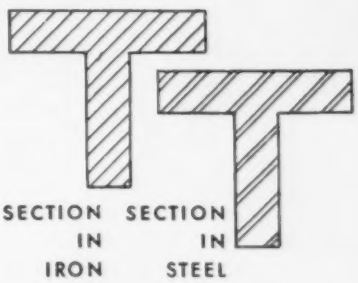


Steel is Ductile. *Withstands impact and shock without fracturing.*



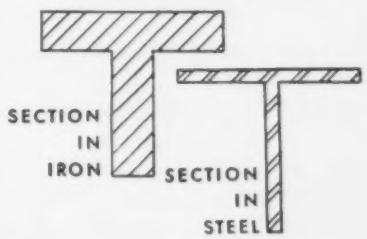
Steel is Twice as Stiff. *Only half the material is needed in welded steel designs to achieve equal rigidity.*

the ACTUAL



Saves 50% Material Cost *by duplicating cross section in steel.*

increasing the YIELD



Needs 60% Less Metal *to achieve equal strength in bending.*

the IMMENSITY of the POSSIBLE

An initial 7 to 1 cost advantage with welded steel

SEE HOW WELDED STEEL CUTS COSTS

Machine Design Sheets are available to designers and engineers. Simply write on your letterhead to Dept. 54

THE LINCOLN ELECTRIC COMPANY

CLEVELAND 1, OHIO

IT'S ALL 'IN THE HEAD'

which is a Ⓑ Special!

The heads of these special bolts have a built-in determination to resist rotation within the molded rubber product encasing them. This extra holding power is all in the head—precision formed on our modern cold-heading machinery. Even though never seen by the customer, this bolt serves him well doing a special job of bonding the strength of steel with the resilience of rubber.

THIS Ⓑ MASSAGE CUP BOLT is typical of many molded-in-rubber applications in which the life of the product depends upon a special Ⓑ Bolt

APPLICATIONS Similar applications of rubber encased bolt heads are found in cushion mounts, automotive bumpers, vacuum cups, motor mountings, shockless suspensions and in track pads.

We have a "Special" answer

FOR EVERY "SPECIAL" PROBLEM

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Our Specialty is **"SOMETHING SPECIAL"**

production ideas

Continued

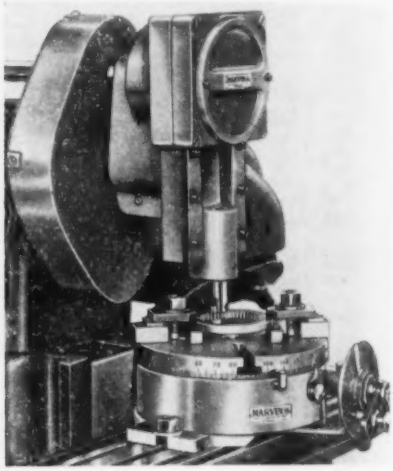
down to tenths, it is said. Setting for required angles is provided by a vernier scale, graduated in minutes. The Tangi-Matic dresses from the bottom of the wheel, permitting the operator to control the wheel accurately by using the grinder draw feed. All wearing parts of the dresser are steel, hardened, ground and lapped. *Perfex Tool & Gage Co.*

For more data insert No. 30 on postcard, p. 35.

Slotting Attachment

Versatile, possessing a positive drive, regardless of rate of speed.

The slotter is equipped with a roller chain that eliminates slippage



and allows heavy cuts. Operator protection is provided by a safety hood mounted over the transmission. *Marvin Machine Products, Inc.*

For more data insert No. 31 on postcard, p. 35.

Sand Handling Unit

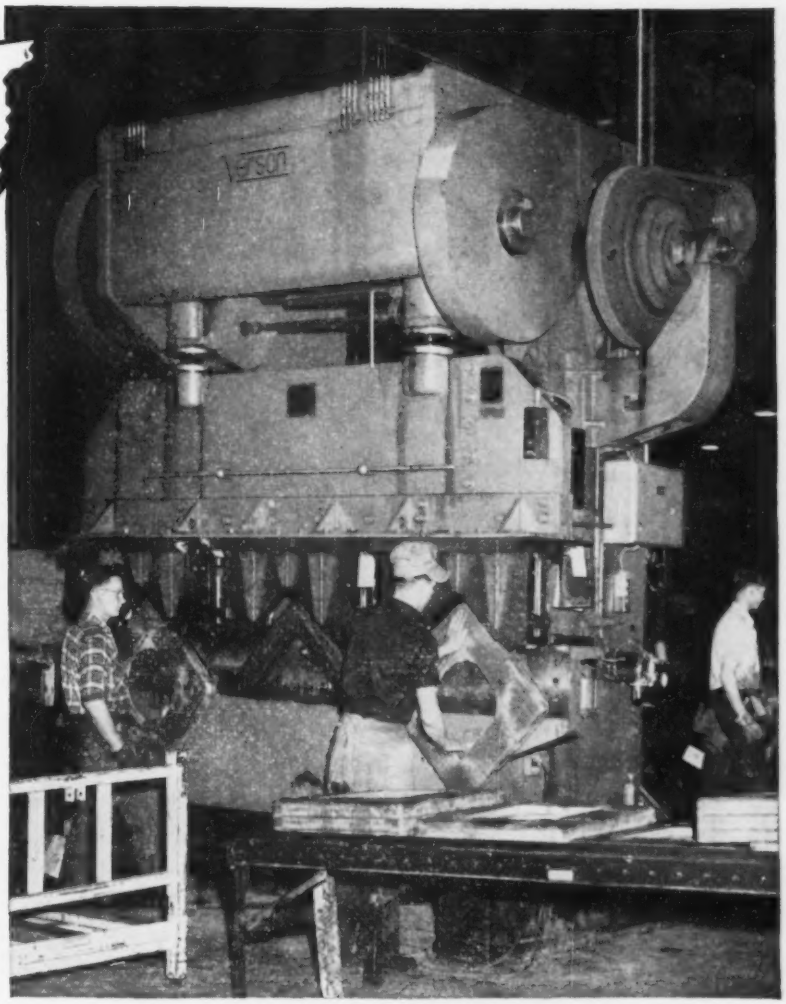
Shakeout and conditioning cycle is automatic; no hand shovelling.

An automatic shakeout, screening, tempering and sand conditioning device—the Reddy Sandy—for foundries saves hand shovelling. Molds are dumped on the vibrating deck of the machine and not on the floor. The shakeout deck separates sand from castings and cores and the sand drops onto a vibrating screen where it is screened and tramp iron and core butts are removed. The sand then travels on a belt conveyer past a magnetic separator (optional) where small

Can you match these production figures?

THIS TRADE Verson MARK PRESS BRAKE TOOL-UP

return flanges 200 washer covers per hour



In modern metal forming procedures, the press brake has become a "Jack-of-all-trades" and a very good one at that. Take the job illustrated above—tops of Maytag automatic washers are return flanged on a Verson Major Press Brake with Verson Tooling—and on a production basis. Yet, as well as the press brake performs on the more complicated jobs, it is equally adaptable to simple bending with runs of just a few pieces.

If you have a forming, bending, coping, notching or punching job, it will pay to consider a Verson Press Brake Tool-Up. There is a Verson Press Brake for every need from 48″ of 16 ga. steel up to long lengths of heavy plate. Both mechanical or hydraulic types are available. Verson Press Brake Tooling can be furnished for virtually every shape from a simple 90° angle to the most intricate multi-operation formed sections.

Descriptive literature giving design details and specifications is available. Write for your copy outlining the nature of your problem. Practical, experienced Verson engineering assistance is also available to help you in the selection of the right equipment for your job.

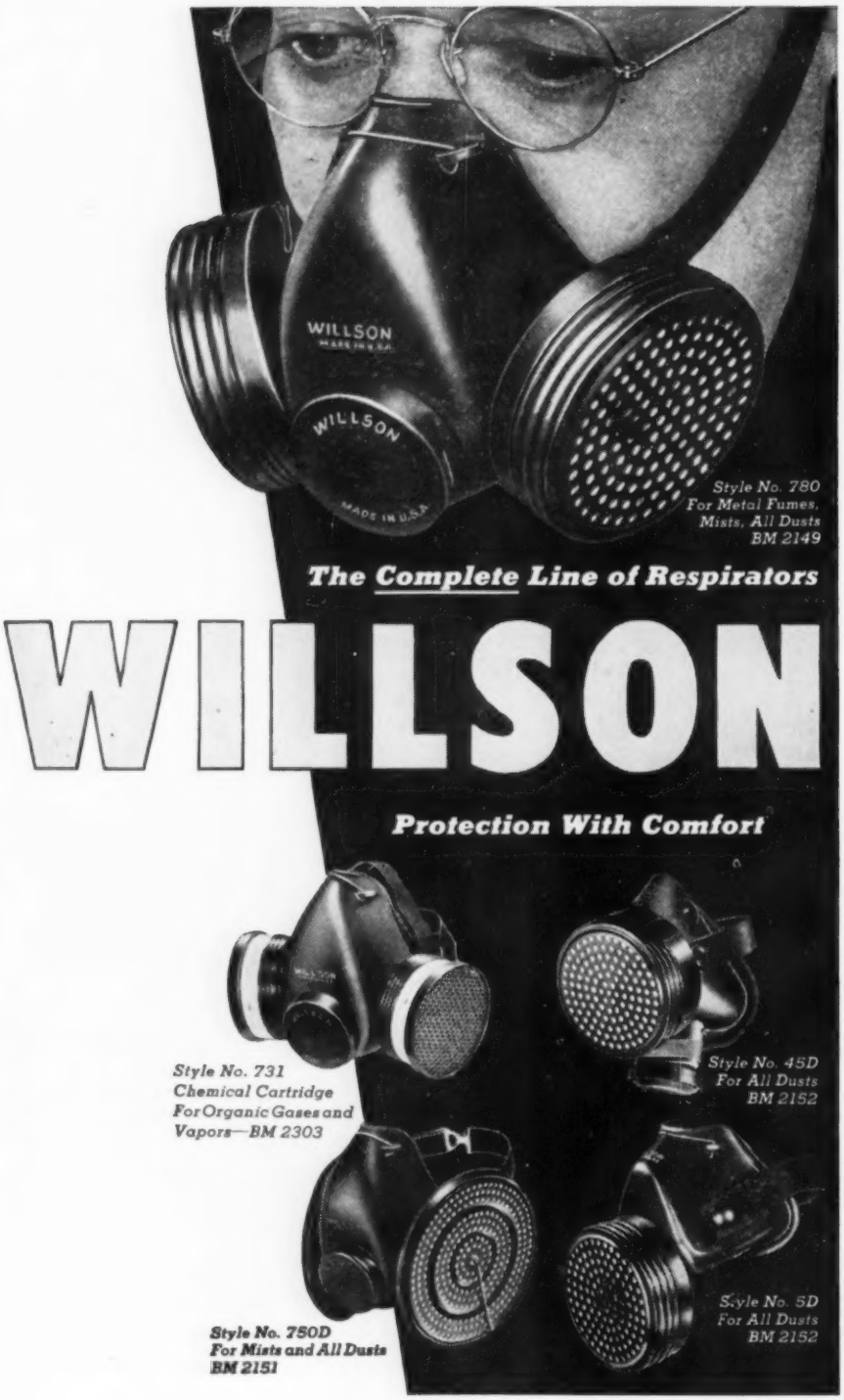
Originators and Pioneers of Allsteel Stamping Press Construction

VERSON ALLSTEEL PRESS COMPANY

9314 South Kenwood Avenue, Chicago 19, Illinois — Holmes Street and Ledbetter Drive, Dallas 8, Texas

A VERSON PRESS FOR EVERY JOB FROM 60 TONS UP!

MECHANICAL AND HYDRAULIC PRESSES AND PRESS BRAKES • TRANSMAT PRESSES • TOOLING
DIE CUSHIONS • COMPRESSION AND TRANSFER MOLDING PRESSES



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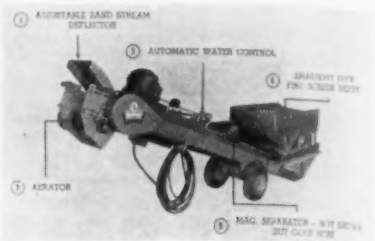
Dependable Products Since 1870
*T. M. Reg. U.S. Pat. Off.

Here is the most complete line of Bureau of Mines approved respiratory protective equipment. It includes filter and cartridge type respirators which are effective against all dusts, mists, fumes and low concentrations of organic vapors. Ease of breathing and comfortable fit assure a low fatigue factor. Choose exactly what you need from selector tables in our new catalog. Get a copy from your nearest WILLSON distributor or write direct to WILLSON PRODUCTS, INC., 231 Washington St., Reading, Pa.

production ideas

Continued

metal particles are removed. Further travel carries it underneath an automatic tempering device which uniformly adds water. As the sand is discharged from the machine, a built-in aerator blends in the water, fluffs the sand and cools it. The



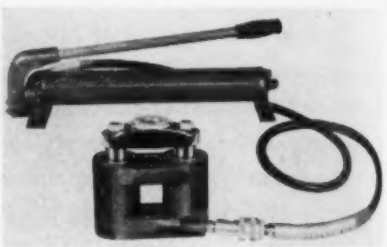
Reddy Sandy is a companion machine to the Handy Sandy unit. When the two machines are used together, sand never has to touch the floor. The shakeout deck of the Reddy Sandy can be used for molds up to 20x30 in. and can handle 12 tons of sand per hr. It occupies 3x11 ft floor space. *Newaygo Engineering Co.*

For more data insert No. 32 on postcard, p. 35.

Hydraulic Puller

Lightweight, compact, weighing 10 lb, developing 15 tons of power.

The Power-Twin has a center hole that makes it quickly and conveniently adaptable to all OTC pulling systems. The ram travels 2 in.,



said to be adequate for 95 pct of all the pulling jobs; another bite takes care of the balance. The remote control pump develops 10,000 psi. Six feet of high pressure hose allows the operator to stand a safe distance from work. *Owatonna Tool Co.*

For more data insert No. 33 on postcard, p. 35.

Stacking-Tiering Truck

Right angle stacks from aisles 24 in. wider than load length.

Expansion of the Spacemaker line includes a 4000-lb capacity model for stacking and tiering

GET GREATER HOLDING POWER

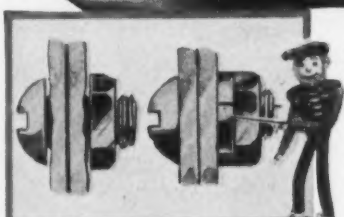
CONTROLLED TENSION

OF GARRETT SPRING LOCK WASHERS

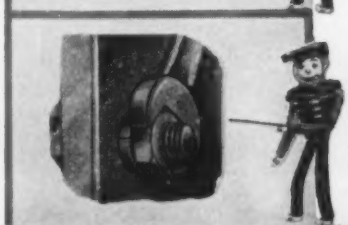
Assures Longer . . . Tighter Assemblies

The washer's live spring action—power zone—determines the life of your assemblies. Garrett's exclusive *Controlled Tension* built into every spring lock washer assures greater spring tension of the correct pressure on every bolt and nut for longer holding power.

Garrett produces spring lock washers by the millions every day to meet every requirement. Made of high carbon steel, bronze, aluminum, stainless steel or monel metal . . . finished in cadmium, nickel, brass or copper.



PROTECTION AGAINST WEAR AND STRETCH
Garrett Spring Lock Washers have extra power zone to compensate for stretch of bolt . . . wear of assembly.



PROVIDES AMPLE BEARING SURFACE
Garrett Spring Lock Washers act as thrust washers . . . furnish bearing surface necessary in tight assembly.

WASHERS TO ARMED FORCES SPECIFICATIONS

Garrett makes a complete line of lock washers to meet all Armed Forces specifications . . . some of them are:

AN 935 BECX 1 BECX 2 BECX 3

We also manufacture all types of flat washers to meet Armed Forces specifications.

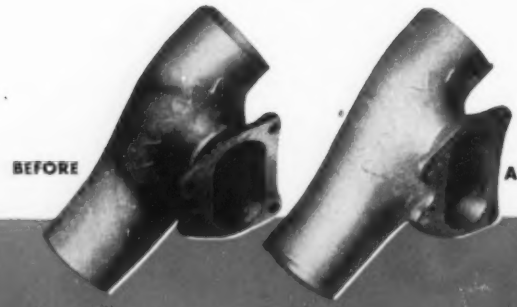
Go to Garrett for quick deliveries. Write today for complete catalog.

GEORGE K. GARRETT COMPANY, INC.
D & TIOGA STREETS PHILADELPHIA 34, PA.

Garrett
OF PENNSYLVANIA

MANUFACTURERS OF

FLAT WASHERS HOSE CLAMPS SPRINGS RETAINING RINGS STAMPINGS



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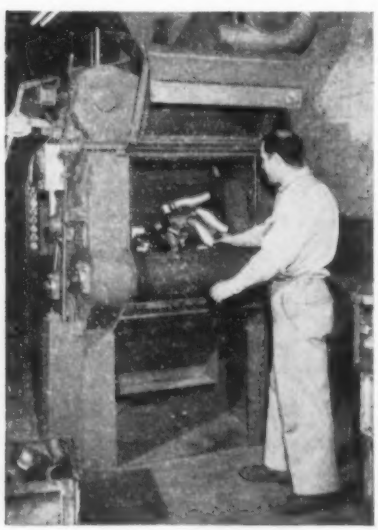
AIRLESS BLAST CLEANING

CLEANS WELDMENTS FASTER

B. H. Aircraft Co., Inc.
Farmingdale, N. Y.

SAVES 86% IN CLEANING TIME

Wheelabrator's fast thorough cleaning action scours metal surfaces brilliantly clean in but a few minutes — to save hours of cleaning time and cut costs to a minimum. That's the story at the B. H. Aircraft Company and everywhere else that Wheelabrator is used. Mr. Donald F. Baum, Vice-President, puts it this way:



"We are currently using the Wheelabrator for cleaning of all details prior to the spot welding and/or silver brazing of these details on our pipe assemblies. These details are made from .032 low carbon and .065 nickel-chrom-moly steel and range up to 4" x 4" in size. The average time for cleaning is about 14% of the time for sand blasting. Sub assembly bodies are now Wheelabrated in 70% of the time formerly required."

See for yourself how this high speed blast cleaning can help you reduce your costs and improve the appearance of your products. Ask for a test demonstration without obligation. *Write today for details.*

Installation of the above Wheelabrator Tumblast saved 86% in cleaning time on pipe assemblies.

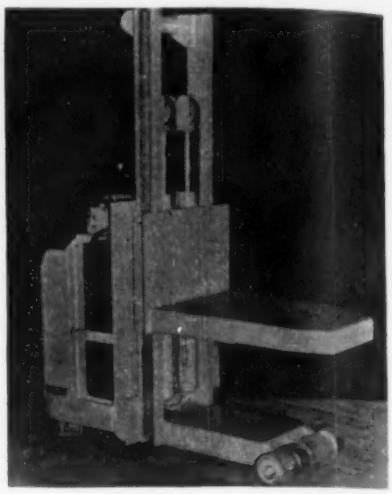
American
WHEELABRATOR & EQUIPMENT CORP.
910 S. Byrkit St., Mishawaka 3, Indiana

WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT

production ideas

Continued

skids. The new model is available with a standard 24-in. wide platform with lengths ranging from 30 to 48 in., and a lowered height of 7 or 11 in. With the standard 83 in. mast, 59 in. of elevation can



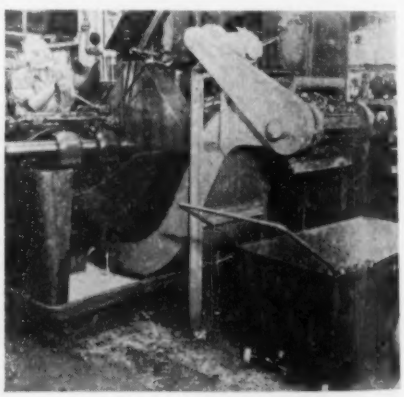
be furnished. Four wheels with heavy duty rubber tires support the load. The tractor is equipped with a 10-in. drive wheel and two 7-in. stabilizing wheels mounted on a spring suspended swivel caster. *Lyon-Raymond Corp.*

For more data insert No. 34 on postcard, p. 35.

Improved Scrap Conveyer

New features include hold-down device and adjustable clutch.

A formed steel hold-down meters turnings, chips and other scrap passing up the hinged steel con-



veyer belt of the improved Chip-Tote conveyer. This unit continuously removes metal chips, borings and turning from operating automatic or multiple-spindle production machines. The device gradually compresses materials being

conveyed into a compact, evenly distributed mass to eliminate jamming of the machine and prevent fall-back of small pieces. An adjustable clutch has been added to the power source for increased safety of operation. If a load in excess of a pre-set limit is imposed on the conveyer belt, the clutch will slip to prevent possible damage to personnel or equipment. Increased height of the belt cover provides greater capacity. *May-Fran Engineering, Inc.*

For more data insert No. 35 on postcard, p. 35.

Heat Treating Furnace

Pit-type; occupies minimum of floor space for volume of work handled.

A new compact pit-type, heat treating furnace can be heated by gas, oil or electricity and provides operating temperatures up to

1250°F. It is available in many basket sizes, circular or rectangular. Simplified loading and unloading is accomplished from the top of the furnace. *Lanly Co.*

For more data insert No. 36 on postcard, p. 35.

Straight-Line Control

Device anticipates fuel needs of controlled heating equipment.

By anticipating the heat transfer lags, a new Capaciline straight-line control automatically reduces to a minimum the on-off variations of a control instrument above and below the preset control point, thus enforcing a straight line control on the heating variable. It is operated through a simple electrical circuit and is available as a small self-contained unit or as a built-in feature of Wheelco's electronic controllers and strip chart recorders. *Wheelco Instruments Co.*

For more data insert No. 37 on postcard, p. 35.

Resume Your Reading on Page 39

EVERY SHIPMENT BECOMES **FAST FREIGHT**

FOR EVERY INDUSTRY, Towmotor Mass Handling provides *swift movement* of materials . . . the greatest single step to increased productive output and lowered costs. Record-breaking speed in unloading carloads of materials, and fast in-plant movement of heavy loads are commonplace when Towmotor Mass Handling makes *"fast freight"* of every shipment in thousands of America's leading plants. Twelve Towmotor models, with capacities from 1,500 to 15,000-lbs. simplify and speed-up every type of handling job. Learn the right answer to cost-cutting efficiency in your plant. Send the coupon today for new folders describing the complete Towmotor line and special engineering features. Representatives in all principal cities in U. S. and Canada.

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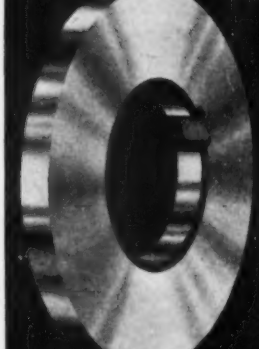

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H&G DIE HEAD

See our Advt. on page 130 Mar. 1st

THE EASTERN MACHINE SCREW CORP., 21-41 Barclay St. New Haven, Conn. Pacific Coast Representative: A. C. Behringer, 334 N. San Pedro St., Los Angeles, Calif. CANADA: F. F. Barber Machinery Company, Toronto

IRON AGE *markets and prices*

market briefs and bulletins

barter system—Some steel mills are having almost as much trouble getting steel for their own expansion as their customers. Horsetrading of steel among themselves is becoming almost common. In addition, one mill shipped sheets to the customer of another mill in exchange for structurals. In another instance they had to ship steel to a warehouse for further processing and, of course, paid the usual warehouse price when the steel was delivered.

low for year—A decrease in volume of trade and a decline in industrial production dropped the business index in the Pittsburgh district to 185.8 in the week ended Mar. 17, lowest level this year. The index compared with 196.9 in the previous week. Department store sales were off 5 pct despite the Easter buying stimulus.

Canada tightens belt—More rigid controls of metals are in store for Canada to meet essential needs. Steel restrictions may be widened, and controls over molybdenum and tungsten may be invoked. Other materials getting a close scrutiny are aluminum, antimony, cobalt, copper, lead, nickel, tin and zinc, asbestos and industrial diamonds.

hurt most—Non-defense users of steel will be backed against the wall by the third quarter of 1951. Government competition for steel will cause many to curtail production and put others out of business. One company reports as much as 89 pct of one product is going for government "must" orders.

melt for conversion—Ohio River Steel Corp. has leased two 7-ton electric furnaces at the Park Works of Crucible Steel Co. from the M. E. Solomon Co., and is melting on a conversion basis.

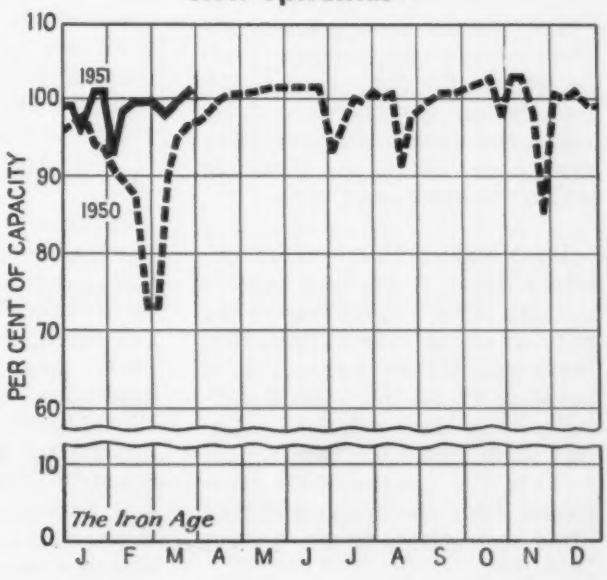
new plant—General Refractories Co. will build a new plant at Warren, Ohio. The company previously announced plans to construct new plants in Los Angeles and Morrisville, Pa.

passenger car tires—Second quarter deliveries of set-asides of tires and tubes for new passenger cars will be limited to 75 pct of first quarter 1951 deliveries under an amendment to NPA M-2. Inventories will be held to a 30-day supply. Extension of DO-97 for solid and pneumatic tires and tubes will be forbidden. By shipping cars without spares, it is estimated the reduction in tires will only cut new car shipments 5 pct.

plate vs sheet—Sheet consumers are well aware that if plate production is further boosted existing sheet promises may go out the window. This, plus the promise of CMP by July, has them concentrating on just getting through June. Projections after that are based on hope rather than conviction.

rails to shells—Some mills now rolling new steel rails may soon be shifted to production of shell quality bars. As a result, output of new rails this year is not expected to reach the 1950 level.

Steel Operations**



District Operating Rates—Per Cent of Capacity**

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	West	Buffalo	Cleveland	Detroit	Wheeling	South	Ohio River	St. Louis	East	Aggregate
Mar. 18	89.0*	106.5*	97.0	100.0*	107.7	104.0	99.0*	103.0*	100.0	102.5	92.0	97.2	103.3	100.0
Mar. 25	98.0	105.0	97.0	100.0	106.0	104.0	99.0	106.0	100.0	102.5	92.0	95.1	105.1	103.0

* Revised.
** Beginning Jan. 1, 1951, operations are based on annual capacity of 104,229,650 net tons.

nonferrous metals

outlook and market activities

NONFERROUS METALS PRICES

	Mar. 21	Mar. 22	Mar. 23	Mar. 24	Mar. 26	Mar. 27
Copper, electro, Conn....	24.50	24.50	24.50	24.50	24.50	24.50
Copper, Lake delivered..	24.625	24.625	24.625	24.625	24.625	24.625
Tin, Straits, New York....	$1.34	$1.34	$1.34	....	$1.34	$1.34
Zinc, East St. Louis	17.50	17.50	17.50	17.50	17.50	17.50
Lead, St. Louis	16.80	16.80	16.80	16.80	16.80	16.80

Note: Quotations are going prices.

by R.Hatschek

Scrap in Turmoil—Washington delays in issuing orders for the control of scrap metal prices coupled with extremely high demand and poor supply have created a havoc in the scrap market. Prices are climbing skyward; dealers are paying 25½¢ per lb for No. 1 copper, 24¢ for No. 2, and 22¢ for light copper.

The feeling that ceilings are just around the corner lends urgency to the fantastic competition in an already competitive trade. Some say that a price order must come, others say that they want it to come—and soon.

Ingot Makers Hurt—These spiraling scrap costs are rapidly pushing ingot makers over to the red side of the ledger. Secondary brass and bronze men are in a position where they would normally raise their prices to maintain profit levels but they cannot do so legally because of the price freeze. Only two weeks ago they lifted their prices to the highest legal limit.

Zinc Okayed for Printers—National Production Authority has ruled that zinc may be used for printing and engraving purposes and may be obtained under a DO-97 rating for maintenance, repair and operating supplies. In issuing the order, NPA pointed out that there is only a 3 pct loss of zinc in this use of the metal and that the remaining 97 pct of high-grade scrap can be easily processed for re-use.

Okay Tariff Suspension—The House Ways and Means Committee last week unanimously approved H. R. 3336, the bill to suspend the copper import tariff. Originally introduced by Representative Mills, D., Ark., the bill would suspend the 2¢ per lb tariff from Apr. 1, 1951, to Feb. 15, 1953.

In order to placate mining state Congressmen, the bill also provides for the reinstatement of the tariff if the price of copper should fall below 24¢ per lb, a very unlikely possibility under present conditions. In the event that this should happen, it would be mandatory for the president to reinstate the tariff within 35 days. The bill will probably be put before the House as soon as the Easter recess is over.

Suggest RFC Dissolution—Another bill before Congress is one in the Senate proposing the abolishment of the Reconstruction Finance Corp. Its function as the sole importer of tin into this country would then be taken over by the Office of Defense Mobilization along with other similar functions.

Meanwhile, private tin importers are wondering what to do with their time. The government, in taking over their job and preventing them from doing their normal business, made no provisions whatever in consideration of the trade. It is reported that a number of men from the tin trade went to Washington for conferences with RFC and NPA on this subject but at press time nothing concrete had emanated from those agencies on the problem.

More Confusion in Aluminum—Mounting scrap prices, high demand and the price freeze are causing confusion in the secondary aluminum field as well as others. The indicated rebirth of conversion deals is pushing up prices and reports are heard of 2S aluminum clippings bringing as high as 35¢ per lb.

Aluminum ingot makers are passing by much business in which a profit would be impossible or certain necessary scrap is unobtainable because of the price stabilization order. Some such business is being taken for old, steady customers but, to sum it up, the current ceilings are holding up the whole market.

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.188 in., 2S, 3S, 30.1¢; 4S, 61S-O, 32¢; 52S, 34.1¢; 24S-O, 24S-OAL, 32.9¢; 75S-O, 75S-OAL, 39.9¢; 0.081 in., 2S, 3S, 31.2¢; 4S, 61S-O, 33.5¢; 52S, 35.6¢; 24S-O, 24S-OAL, 34.1¢; 75S-O, 75S-OAL, 41.8¢; 0.032 in., 2S, 3S, 32.9¢; 4S, 61S-O, 37.1¢; 52S, 39.8¢; 24S-O, 24S-OAL, 41.7¢; 75S-O, 75S-OAL, 52.2¢.

Plate: ½ in. and heavier: 2S, 3S-F, 28.3¢ 4S-F, 30.2¢; 52S-F, 31.8¢; 61S-O, 30.3¢; 24S-O, 24S-OAL, 32.4¢; 75S-O, 75S-OAL, 38.8¢.

Extruded Solid Shapes: Shape factors 1 to 5, 36.2¢ to 74.5¢; 12 to 14, 36.9¢ to 39¢; 24 to 26, 39.6¢ to $1.16; 36 to 38, 47.2¢ to $1.70.

Rod, Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 37.5¢ to 33.5¢; cold-finished, 0.375 to 3 in., 2S-F, 3S-F, 40.5¢ to 35¢.

Screw Machine Stock: Rounds, 11S-T3, ⅛ to 11/32 in., 53.5¢ to 42¢; ⅜ to 1½ in., 41.5¢ to 39¢; 1 9/16 to 3 in., 38.5¢ to 36¢; 17S-T4 lower by 1.5¢ per lb. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in., 2S, 39.5¢ to 29¢; 52S, 48¢ to 35¢; 56S, 51¢ to 42¢; 17S-T4, 54¢ to 37.5¢; 61S-T4, 48.5¢ to 37¢; 75S-T6, 84¢ to 67.5¢.

Extruded Tubing, Rounds: 63S-T5, OD in in.: 1¼ to 2, 37¢ to 54¢; 2 to 4, 33.5¢ to 45.5¢; 4 to 6, 34¢ to 41.5¢; 6 to 9, 34.5¢ to 43.5¢.

Roofing Sheet, Flat: 0.019 in. x 28 in. per sheet, 72 in., $1.142; 96 in., $1.522; 120 in., $1.902; 144 in., $2.284. Gage 0.024 in. x 28 in., 72 in., $1.379; 96 in., $1.839; 120 in., $2.299; 144 in., $2.759. Coiled Sheet: 0.019 in. x 28 in., 28.2¢ per lb.; 0.024 in. x 28 in., 26.9¢ per lb.

Magnesium

(F.o.b. mill, freight allowed)

Sheet and Plate: FS1-O, ¼ in. 63¢; 3/16 in. 65¢; ⅛ in. 67¢; B & S Gage 10, 68¢; 12, 72¢; 14, 78¢; 16, 85¢; 18, 93¢; 20, $1.05; 22, $1.27; 24, $1.67. Specification grade higher. Base: 30,000 lb.

Extruded Round Rod: M, diam in., ¼ to 0.311 in., 74¢; ½ to ¾ in., 57.5¢; 1¼ to 1.749 in., 53¢; 2½ to 5 in., 48.5¢. Other alloys higher. Base: Up to ¾ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M. In weight per ft, for perimeters less than size indicated, 0.10 to 0.11 lb, 3.5 in., 62.3¢; 0.22 to 0.25 lb, 5.9 in., 59.3¢; 0.50 to 0.59 lb, 8.6 in., 56.7¢; 1.3 to 2.59 lb, 19.5 in., 53.3¢; 4 to 6 lb, 28 in., 49¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ in. to 5/16, $1.40; 5/16 to ⅜, $1.26; ½ to ⅝, 93¢; 1 to 2 in., 76¢; 0.165 to 0.219, ⅝ to ¾, 61¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in in.: Up to 1½ in., 10,000 lb; 1½ in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheet and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $6; Forgings, $6.

Nickel and Monel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel
Sheets, cold-rolled	71½	57
Strip, cold-rolled	77½	60
Rods and bars	67½	55
Angles, hot-rolled	67½	55
Plates	69½	56
Seamless tubes	100½	90
Shot and blocks	....	50

Copper, Brass, Bronze

(Freight prepaid on 200 lb includes duty)

	Sheets	Rods	Extruded Shapes
Copper	41.03	....	40.63
Copper, h-r	....	36.33	....
Copper, drawn	....	38.18	....
Low brass	39.15	38.84	....
Yellow brass	38.28	37.97	....
Red brass	40.14	39.83	....
Naval brass	43.08	38.61	38.07
Leaded brass	....	32.63	36.70
Com'l bronze	41.13	40.82	....
Mang. bronze	45.96	40.65	41.41
Phos. bronze	60.20	60.45	....
Muntz metal	40.43	36.74	37.59
Ni silver, 10 pct	49.27	51.49	....
Arch. bronze	....	....	35.11

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	19.00
Aluminum pig	18.00
Antimony, American, Laredo, Tex.	42.00
Beryllium copper, 3.75-4.25% Be	$1.56
Beryllium aluminum 5% Be, Dollars per lb contained Be	$69.00
Bismuth, ton lots	$2.25
Cadmium, del'd	$2.55
Cobalt, 97-99% (per lb)	$2.10 to $2.17
Copper, electro, Conn. Valley	24.50
Copper, Lake, delivered	24.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$200
Lead, St. Louis	16.80
Lead, New York	17.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb	24.50
Magnesium, sticks, 100 to 500 lb	42.00 to 44.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$216-$220
Nickel, electro, f.o.b. New York	53.56
Nickel oxide sinter, f.o.b. Copper Cliff, Ont., contained nickel	46.75
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$90 to $93
Silver, New York, cents per oz.	90.16
Tin, New York	$1.34
Titanium, sponge	$5.00
Zinc, East St. Louis	17.50
Zinc, New York	18.22
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	29.00
No. 120	28.50
No. 123	28.00
80-10-10 ingot	
No. 305	35.00
No. 315	32.00
88-10-2 ingot	
No. 210	47.50
No. 215	44.50
No. 245	37.00
Yellow ingot	
No. 405	25.50
Manganese bronze	
No. 421	32.75

Aluminum Ingot

(Cents per lb, 30,000 lb lots)

95-5 aluminum-silicon alloys	
0.30 copper, max.	34.00-35.00
0.60 copper, max.	33.75-34.75
Piston alloys (No. 122 type)	31.50-32.00
No. 12 alum. (No. 2 grade)	30.25-31.25
108 alloy	31.50-32.00
195 alloy	32.50-33.00
13 alloy	34.00-35.00
ASX-679	31.50-32.00

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	32.50-33.50
Grade 2—92-95%	31.50-32.50
Grade 3—90-92%	30.50-31.50
Grade 4—85-90%	29.50-30.50

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	39⅛
Electrodeposited	33⅜
Rolled, oval, straight, delivered	38⅜
Forged ball anodes	43
Brass, 80-20	
Cast, oval, 15 in. or longer	34¾
Zinc, oval	26½
Ball anodes	25½
Nickel 99 pct plus	
Cast	70.50
Rolled, depolarized	71.50
Cadmium	$2.80
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	79½

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	52.15
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	20½
Nickel chloride, 375 lb drum	27½
Silver syanide, 100 oz lots, per oz.	67¼
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drums	45.85

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	23	22¼
Yellow Brass	20½	18⅝
Red brass	21¼	20⅝
Comm. bronze	21⅝	21
Mang. bronze	19½	18⅝
Brass rod ends	19⅞	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	21.50
No. 2 copper wire	20.00
Light copper	19.00
Refinery brass	19.50*
Radiators	15.00

*Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer)

No. 1 copper wire	28.00-29.00
No. 2 copper wire	25.00-26.00
Light copper	23.50-24.50
No. 1 composition	24.50-25.00
No. 1 comp. turnings	24.00-24.50
Rolled brass	19.00
Brass pipe	20.50
Radiators	19.00-19.50
Heavy yellow brass	19.00-19.50

Aluminum

Mixed old cast	20 —21
Mixed new clips	23 —24
Mixed turnings, dry	20½—21
Pots and pans	20½—21
Low copper	25

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass	
No. 1 heavy copper and wire	25⅛
No. 2 heavy copper and wire	24
Light copper	22
New type shell cuttings	22
Auto radiators (unsweated)	17 —17½
No. 1 composition	21 —21½
No. 1 composition turnings	20 —20½
Clean red car boxes	18 —18⅛
Cocks and faucets	18 —18⅛
Mixed heavy yellow brass	16 —16⅛
Old rolled brass	18 —18½
Brass pipe	19 —19½
New soft brass clippings	19 —20
Brass rod ends	18 —18½
No. 1 brass rod turnings	17½—18
Aluminum	
Alum. pistons and struts	12 —13
Aluminum crankcases	15½—16
2S aluminum clippings	19 —19½
Old sheet and utensils	15½—16
Borings and turnings	12½—13
Misc. cast aluminum	15½—16
Dural clips (24S)	15½—16
Zinc	
New zinc clippings	16 —17
Old zinc	11 —12
Zinc routings	8½— 9
Old die cast scrap	8 — 9½
Nickel and Monel	
Pure nickel clippings	90 —100
Clean nickel turnings	80 —90
Nickel anodes	90 —100
Nickel rod ends	90 —100
New Monel clippings	30 —35
Clean Monel turnings	20 —25
Old sheet Monel	25 —30
Inconel clippings	30 —35
Nickel silver clippings, mixed	16 —18
Nickel silver turnings, mixed	15 —16
Lead	
Soft scrap, lead	15¼—15⅜
Battery plates (dry)	9 — 9½
Magnesium	
Segregated solids	9 —10
Castings	5½— 6½
Miscellaneous	
Block tin	95 —100
No. 1 pewter	80 —85
No. 1 auto babbitt	75 —80
Mixed common babbitt	12¼—12½
Solder joints	23 —24
Siphon tops	75 —80
Small foundry type	18¼—18½
Monotype	16¾—17
Lino. and stereotype	16½—16¾
Electrotype	15 —15½
Hand picked type shells	11½—11⅝
Lino. and stereo. dross	8¾— 9
Electro. dross	6¾— 7

SCRAP *iron and steel*

markets
prices
trends

Scrap center reports stay on gloomy side . . .
Allocations spread like wildfire as some open-hearth output loss seen nearer.

In large and small scrap centers reports were gloomy. The challenge has been thrown to the trade and they are in a continual push to get out the scrap. It is galling for them to invest twice the normal effort and come up with a fraction of yesteryear's scrap. Supply sources are temporarily fagged out and the trade can be credited for squeezing out every last ton of scrap that is available.

The shortage has spread allocations like wildfire and Pittsburgh sources estimate that as much as 50 pct of shipments are now being allocated. It is a symptom of the shortage that is likely to increase. Many are looking at the weather and hoping that the thaw will bring a heavy scrap flow.

See p. 105 for story on scrap shortage.

But while inventories fall further loss of openhearth production looms. Cleveland reports this week that loss of some openhearth output is probable within 10 days.

Two districts proved sensitive to Washington orders this week. Detroit's local OPS office notified the field that its official No. 1 heavy price was $39.05 rather than $40.20, as some scrap men claimed. Shipments will be braked to a stop. Boston shipments stopped because of a Washington rumor that a water-rate may be forthcoming for that area.

PITTSBURGH—Principal subjects discussed here include (1) proposed amendments to price control schedule, (2) proposed inspection set-up, (3) allocations. Some sources insist amendments will be announced this week, including grouping of No. 1 and No. 2 heavy melting and dealer bundles as one grade with an accompanying adjustment in price. Control authorities apparently are planning inspection points in railroad yards, rather than at mills. Allocations are increasing, with estimates that as much as 50 pct of scrap is now being allocated.

CHICAGO—As scrap becomes tighter in the Chicago area, mills are reported stepping up direct dealing with plants to get scrap. Allocations seem to be increasing with some mills in the area said to have received relief through them. Collection mechanisms in the country areas have broken down during the winter and less scrap is coming into the yards. Dealers are scrambling to pick up tonnage. Concentrations on preparation of foundry grades is taking some scrap away from the openhearths. Clippings are bringing $40 per gross ton according to some sources.

PHILADELPHIA—Mills in this district are almost desperate in their search for scrap to keep up the high operating rates as scrap stocks dwindle. Dealers' yards are virtually clean but the expectation is that collections will improve with the weather. It is felt by some members of the trade that if the mills can keep up their operations until April, the situation will begin to clear up.

NEW YORK—The trade here is working at quick tempo to get scrap to needy customers. Although some reported a shade of improvement in shipments, overall movement was as slow as last week's. Some in the market feel that if the planned OPS scrap investigators harp too critically on minor points shippers cannot avoid in a tight market, a lot of confusion and bad feeling may ensue. Allocations are now vastly increased.

DETROIT—Scrap trade in the Detroit area became hectic early this week when dealers, brokers and plants were notified by the local OPS they violated pricing regulations by using $40.20 rather than $39.05 as the official Detroit price of No. 1 scrap. Sources in the trade claim this price was based on an official Washington interpretation and any further ruling will have to come from there. Rumors that the $40.20 base will be made official, but not retroactive, are heard. The situation will halt scrap movements until cleared up.

CLEVELAND—Outlook for consumers here and in the Valley this week is grim. Some mills are getting more allocations and losing more inventory every week and one consumer in the Cleveland district is in rough shape. Loss of some openhearth production is probable within 10 days, barring improvement in scrap supply. Big hope is that warm weather will bring out additional tonnage. Foundries are on a hand-to-mouth basis.

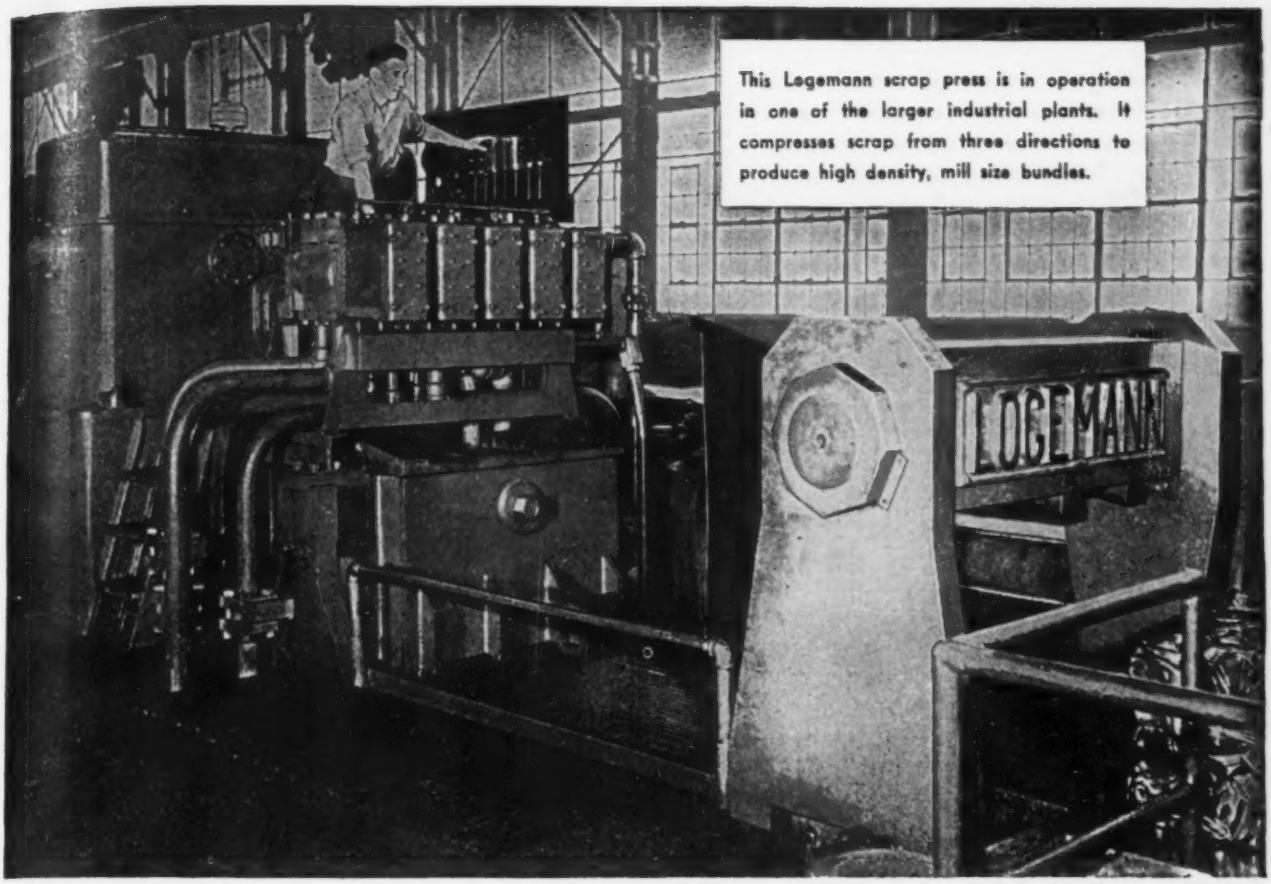
ST. LOUIS—Offerings of railroad scrap in St. Louis are the lightest in years—due to cold, rainy weather and lessening of available supply. Because of the car shortage railroads are repairing rather than dismantling old equipment. Fewer locomotives are being dismantled. Offerings from the country also have been light throughout March due to inclement weather. Consumers have been eating into inventories.

BIRMINGHAM—Scrap is still coming into the district slowly. Mills and foundries are buying everything they can get and begging for more. Dealers and brokers say they have been able to buy a fair amount, but a shortage of freight cars is holding up shipments.

CINCINNATI—Demand exceeds supply here and consumers are anything but comfortable. Yards are releasing some scrap but tonnages are limited. Producing plants are earmarking some tonnage, and part of this is moving out of the district. Foundries are battling for tonnage, and cast grades, low phos and rail are very scarce. No. 1 heavy melting steel and No. 1 bundles are not plentiful but small tonnages are moving.

BOSTON—Scrap stood still this week as dealers stopped shipments on the Washington rumor Boston might be put on a water-rate basis. This would place Boston in a better competitive position with Bridgeport, Providence and New Haven where some dealers are reported to have been making shipments by barge. Unstripped motor blocks, long under the ceiling, have moved to the ceiling price of $43.

BUFFALO—The scrap shortage became more of a problem this week as a decided shrinkage was noted in tonnage moving to local consumers from outlying sections which usually ship here. Local people hate to see local scrap being grabbed by out-of-area users. Mills continue to draw on inventory and one leading mill here has increased the hot metal charge.



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LOGEMANN BROTHERS COMPANY
3164 W. Burleigh Street • Milwaukee 10, Wisconsin

Iron and Steel SCRAP PRICES

(Maximum basing point prices, per gross ton, as set by OPS, effective Feb. 7, 1951. Shipping point and delivered prices calculated as shown below.)

Switching Charge (Dollars per gross ton) →	$0.99	.75	.33	.85	.75	.51	.75	.75	.51	.51	.75	.70	.76	.83	.85	.26	1.34	.79	.50	.20	.51	.51	.20	.82	.47	.51	.51	.51	.51	.95	.50	.75	.50	.43	.51	.33	.57	.88	.65	.52	.88	.52
Basing Points →	Pittsburgh	Johnstown	Brackenridge	Butler	Midland	Monessen	Sharon	Youngstown	Canton	Steubenville	Warren	Weirton	Cleveland	Buffalo	Cincinnati	Middletown	Chicago	Claymont	Coatesville	Conshohocken	Harrisburg	Phoenixville	Sparrows Pt.	Bethlehem	Ashland, Ky.	Kokomo, Ind.	Portsmouth, O.	St. Louis	Detroit	Duluth	Kansas City	Birmingham	Alabama City	Atlanta	Minneapolis	Houston	Los Angeles	Pittsburg, Cal.	Portland, Ore.	San Francisco	Seattle
GRADES **OPS No.**																																										
No. 1 heavy melting....1	$44.00							$44.00					$43.00				$42.50						$42.00					$41.00	$40.00		$39.50				$39.00	$38.00					$35.00
No. 2 heavy melting....2	42.00							42.00					41.00				40.50						40.00					39.00	38.00		37.50				37.00	36.00					33.00
No. 1 busheling....3	44.00							44.00					43.00				42.50						42.00					41.00	40.00		39.50				39.00	38.00					35.00
No. 1 bundles....4	44.00							44.00					43.00				42.50						42.00					41.00	40.00		39.50				39.00	38.00					37.00
No. 2 bundles....5	41.00							41.00					40.00				39.50						39.00					38.00	37.00		36.50				36.00	35.00					34.00
Machine shop turnings....6	34.00							34.00					33.00				32.50						32.00					31.00	30.00		29.50				29.00	28.00					27.00
Mixed borings and turnings....7	38.00							38.00					37.00				36.50						36.00					35.00	34.00		33.50				33.00	32.00					31.00
Shoveling turnings....8	38.00							38.00					37.00				36.50						36.00					35.00	34.00		33.50				33.00	32.00					31.00
Cast iron borings....10	38.00							38.00					37.00				36.50						36.00					35.00	34.00		33.50				33.00	32.00					31.00
No. 1 chemical borings....26	41.00							41.00					40.00				39.50						39.00					38.00	37.00		36.50				36.00	35.00					34.00
Forge crops....11	51.50							51.50					50.50				50.00						49.50					48.50	47.50		47.00				46.50	45.50					44.50
Bar crops and plate....12	49.00							49.00					48.00				47.50						47.00					46.00	45.00		44.50				44.00	43.00					42.00
Punchings and plate....14	46.50							46.50					45.50				45.00						44.50					43.50	42.50		42.00				41.50	40.50					39.50
Electric furnace bundles....15	46.00							46.00					45.00				44.50						44.00					43.00	42.00		41.50				41.00	40.00					39.00
Cut struct., plate, 3 ft and less....16	47.00							47.00					46.00				45.50						45.00					44.00	43.00		42.50				42.00	41.00					40.00
Cut struct., plate, 2 ft and less....17	49.00							49.00					48.00				47.50						47.00					46.00	45.00		44.50				44.00	43.00					42.00
Cut struct., plate, 1 ft and less....18	50.00							50.00					49.00				48.50						48.00					47.00	46.00		45.50				45.00	44.00					43.00
Foundry steel, 2 ft and less....20	46.00							46.00					45.00				44.50						44.00					43.00	42.00		41.50				41.00	40.00					39.00
Foundry steel, 1 ft and less....21	48.00							48.00					47.00				46.50						46.00					45.00	44.00		43.50				43.00	42.00					41.00
Heavy turnings....24	43.00							43.00					42.00				41.50						41.00					40.00	39.00		38.50				38.00	37.00					36.00
No. 1 RR heavy melting....RR 1	46.00							46.00					45.00				44.50						44.00					43.00	42.00		41.50				41.00	40.00					39.00
Scrap rails, random lengths...RR 14	48.00							48.00					47.00				46.50						46.00					45.00	44.00		43.50				43.00	42.00					41.00
Scrap rails, 3 ft and less....RR 16	51.00							51.00					50.00				49.50						49.00					48.00	47.00		46.50				46.00	45.00					44.00
Scrap rails, 2 ft and less....RR 17	52.00							52.00					51.00				50.50						50.00					49.00	48.00		47.50				47.00	46.00					45.00
Scrap rails, 18 in. and less....RR 18	54.00							54.00					53.00				52.50						52.00					51.00	50.00		49.50				49.00	48.00					47.00
Rerolling rails....RR 15	53.00							53.00					52.00				51.50						51.00					50.00	49.00		48.50				48.00	47.00					46.00
Uncut tires....RR 20	48.00							48.00					47.00				46.50						46.00					45.00	44.00		43.50				43.00	42.00					41.00
Cut tires....RR 21	51.00							51.00					50.00				49.50						49.00					48.00	47.00		46.50				46.00	45.00					44.00
Cut bolsters and side frames...RR 23	49.00							49.00					48.00				47.50						47.00					46.00	45.00		44.50				44.00	43.00					42.00
RR specialties....RR 24, 28, 29	51.00							51.00					50.00				49.50						49.00					48.00	47.00		46.50				46.00	45.00					44.00
Solid steel axles....RR 25	58.00							58.00					57.00				56.50						56.00					55.00	54.00		53.50				53.00	52.00					51.00
No. 3 steel wheels....RR 27	51.00							51.00					50.00				49.50						49.00					48.00	47.00		46.50				46.00	45.00					44.00

Cast Scrap

(F.o.b. all shipping points)

Grades	OPS No.	
Cupola cast	1	$49.00
Charging box cast	2	47.00
Heavy breakable cast	3	45.00
Cast iron brake shoes	5	41.00
Stove plate	6	46.00
Clean auto cast	7	52.00
Unstripped motor blocks	8	43.00
Cast iron carwheels	9	47.00
Malleable	10	55.00
Drop broken mach'y. cast	11	52.00

SWITCHING DISTRICTS—These basing points include the indicated switching districts: Pittsburgh; Bessemer, Homestead, Duquesne, Munhall. Cincinnati; Newport. St. Louis; Granite City, East St. Louis, Madison. San Francisco; South San Francisco, Niles, Oakland. Claymont; Chester. Chicago; Gary. Los Angeles; Firestone.

SHIPPING POINT PRICES (Except RR scrap)—For shipping points within basing points, the ceiling shipping point price is the basing point price, less switching charge. The ceiling for shipping points outside basing points is the basing point price yielding the highest shipping point price, less the lowest established freight charge. Dock charge, where applicable, is $1.25 per gross ton except: Memphis, 95¢; Great Lakes ports, $1.50, and New England ports, $1.75. Maximum shipping point price on No. 1 heavy melting steel in New York City is $36.99 per gross ton with set differentials for other grades. Hudson and Bergen County, N. J., shipping point prices are computed from Bethlehem basing point. All New Jersey computations use all-rail transport. Ceiling need not fall below $32 per gross ton for No. 1 heavy melting steel, with set differentials for other grades. Cast scrap shipping point prices are given in table.

DELIVERED PRICES (RR scrap)—Ceiling on-line price of a RR operating in a basing point is the top in the highest priced basing point in which the RR operates. For off-line prices, RR's not operating in basing point, non-operating RR's, and RR scrap sold by someone other than a RR see text of order, THE IRON AGE, Feb. 8, 1951, p. 137-C.

DELIVERED PRICES (Except RR scrap)—Ceiling is the shipping point price plus actual freight charge, tax included. Dock charges, where applicable, are as above.

UNPREPARED SCRAP—Ceiling price is $8 a ton less than prepared base grades (No. 1 heavy & No. 1 RR heavy). Scrap suitable for compressing into No. 1 bundles is $6 less than No. 1 bundles; suitable for compressing into No. 2 bundles, $8 less than No. 2 bundles. For cast material requiring special preparation, price is breakable cast less preparation costs.

COMMISSIONS—Brokers are permitted a maximum of $1 per gross ton commission which must be separate on the bill.

ALLOY PREMIUMS—These alloy extras are permitted: Nickel; $1.25 may be added to price of No. 1 heavy for each 0.25 pct nickel between 1 and 5.25 pct. Molybdenum; $2 may be added to price of No. 1 heavy for molybdenum over 0.15 pct, $3 for content over 0.65 pct. Manganese; $4 may be added to price of No. 1 heavy or No. 1 RR heavy for content over 10 pct if scrap is in sizes over 8 x 12 x 24 in., $14 if less than 8 x 12 x 24 in. Manganese premium applicable only if sold for electric furnace use or on NPA allocation. Silicon; electric furnace and foundry grade adjustments are not applicable if silicon content is between 0.5 and 1.75 pct. Chromium; $1 may be added if scrap conforms to SAE 52100 analysis and is to be used in an electric furnace. In no case is price to exceed No. 1 heavy by more than $1. Multiple Alloys; if scrap contains two premium alloy elements, total premium may not exceed ceiling premium for any one contained alloy.

RESTRICTIONS ON USE—Ceiling prices on some scrap items may fluctuate with use by consumers. If some scrap is purchased for its established specialized use, the ceiling price set in the order stands. But if some special grades are purchased for other uses, the ceiling price charge shall be the price of the scrap grade being substituted. For example, the price established for Grade 23 (wrought iron) may be charged only when sold to a producer of wrought iron. Otherwise the ceiling price shall not exceed the ceiling price for the corresponding grade of basic openhearth. Restrictions on use are placed on the following grades: Chemical borings, wrought iron and rerolling rails. Ceiling prices on billet bloom and forge crops, alloy-free turnings, and heavy turnings may be charged only when shipped directly from industrial producer. NPA prohibits openhearth users from buying electric furnace grades, Nos. 11 through 18, foundry grades, Nos. 20 and 21 and cast grades, 1, 7, 9 and 11.

CEILING INTRANSIT PREPARATION CHARGES (Dollars per gross ton)

No. 1 heavy; No. 2 heavy; No. 1 RR heavy; No. 2 RR heavy; No. 1 busheling; No. 2 bundles; electric furnace bundles	$ 8.00
No. 1 bundles; briquetted turnings or cast iron borings; No. 1 RR sheet scrap	6.00
Crushing machine shop turnings	3.00
Bar crops and plate; punchings and plate; structural and plate, 1 ft & less, and 3 ft and less; foundry steel, 1 ft & less and 2 ft & less; wrought iron	10.00
Rails, 3 ft & less; cut tires; cut bolsters & side frames	4.00
Rails, 2 ft & less	5.00
Rails, 18 in. & less	7.00

Hamilton, Ontario

(Consumers buying prices, del'd gross ton)

Hvy. melting steel	$30.00
No. 1 bundles	30.00
No. 2 bundles	29.50
Mechanical bundles	28.00
Mixed, steel scrap	26.00
Rails, remelting	30.00
Rails, rerolling	33.00
Bushelings	24.50
Bushelings, prepared new factory	25.00
Bushelings, unprepared new factory	23.00
Short steel turnings	23.00
Mixed borings, turnings	23.00
Cast scrap	48.00 to 50.00

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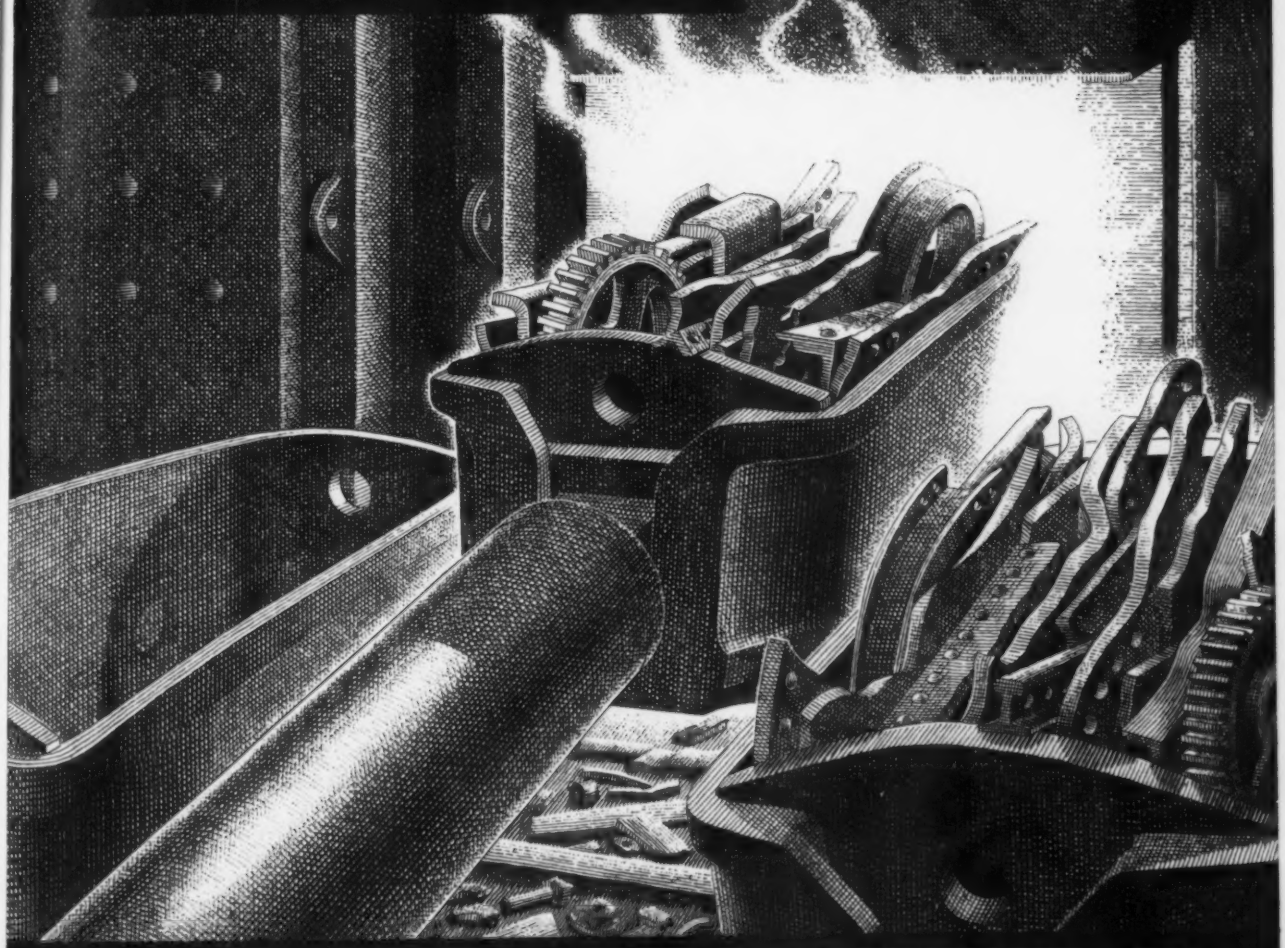

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Comparison of Prices

Steel prices in this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel: (cents per pound)	Mar. 27, 1951	Mar. 20, 1951	Feb. 27, 1951	Mar. 28, 1950
Hot-rolled sheets	3.60	3.60	3.60	3.35
Cold-rolled sheets	4.35	4.35	4.35	4.10
Galvanized sheets (10 ga)	4.80	4.80	4.80	4.40
Hot-rolled strip	3.50	3.50	3.50	3.25
Cold-rolled strip	4.75	4.75	4.75	4.21
Plate	3.70	3.70	3.70	3.50
Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R-strip (No. 302)	36.50	36.50	36.50	33.00
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes.	$7.50	$7.50	$7.50	$7.50
Tinplate, electro (0.50 lb)	6.60	6.60	6.60	6.60
Special coated mfg. ternes	6.35	6.35	6.35	6.50
Bars and Shapes: (cents per pound)				
Merchant bars	3.70	3.70	3.70	3.45
Cold finished bars	4.55	4.55	4.55	*4.145
Alloy bars	4.30	4.30	4.30	3.95
Structural shapes	3.65	3.65	3.65	3.40
Stainless bars (No. 302)	31.25	31.25	31.25	28.50
Wrought iron bars	9.50	9.50	9.50	9.50
Wire: (cents per pound)				
Bright wire	4.85	4.85	4.85	4.50
Rails: (dollars per 100 lb)				
Heavy rails	$3.60	$3.60	$3.60	$3.40
Light rails	4.00	4.00	4.00	3.75
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$56.00	$56.00	$56.00	$54.00
Slabs, rerolling	56.00	56.00	56.00	54.00
Forging billets	66.00	66.00	66.00	63.00
Alloy blooms billets, slabs	70.00	70.00	70.00	66.00
Wire Rod and Skelp: (cents per pound)				
Wire rods	4.10	4.10	4.10	3.85
Skelp	3.35	3.35	3.35	3.15

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*

Pig Iron: (per gross ton)	Mar. 27, 1951	Mar. 20, 1951	Feb. 27, 1951	Mar. 28, 1950
No. 2 foundry, del'd Phila.	$57.77	$57.77	$57.77	$50.42
No. 2, Valley furnace	52.50	52.50	52.50	46.50
No. 2, Southern Cin'ti	55.58	55.58	55.58	49.08
No. 2, Birmingham	48.88	48.88	48.88	42.38
No. 2, foundry, Chicago†	52.50	52.50	52.50	46.50
Basic del'd Philadelphia	56.92	56.92	56.92	49.92
Basic, Valley furnace	52.00	52.00	52.00	46.00
Malleable, Chicago†	52.50	52.50	52.50	46.50
Malleable, Valley	52.50	52.50	52.50	46.50
Charcoal, Chicago	70.56	70.56	70.56	68.56
Ferromanganese‡	186.25	186.25	186.25	173.40

†The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡Average of U. S. prices quoted on Ferroalloy page.

Scrap: (per gross ton)	Mar. 27, 1951	Mar. 20, 1951	Feb. 27, 1951	Mar. 28, 1950
No. 1 steel, Pittsburgh	$44.00*	$44.00*	$44.00*	$32.25
No. 1 steel, Phila. area	42.50*	42.50*	42.50*	24.50
No. 1 steel, Chicago	42.50*	42.50*	42.50*	28.50
No. 1 bundles, Detroit	40.00*	40.00*	40.00*	26.75
Low phos. Young'n	46.50*	46.50*	46.50*	33.75
No. 1 cast, Pittsburgh	49.00†	49.00†	49.00†	39.50
No. 1 cast, Philadelphia	49.00†	49.00†	49.00†	36.50
No. 1 cast, Chicago	49.00†	49.00†	49.00†	40.50

*Basing Pt. †Shipping Pt.
Not including broker's fee after Feb. 7, 1951.

Coke: Connellsville: (per net ton at oven)	Mar. 27, 1951	Mar. 20, 1951	Feb. 27, 1951	Mar. 28, 1950
Furnace coke, prompt	$14.75	$14.75	$14.25	$14.25
Foundry coke, prompt	17.75	17.75	17.25	16.25

Nonferrous Metals: (cents per pound to large buyers)	Mar. 27, 1951	Mar. 20, 1951	Feb. 27, 1951	Mar. 28, 1950
Copper, electro, Conn.	24.50	24.50	24.50	18.50
Copper, Lake, Conn.	24.625	24.625	24.625	18.625
Tin Straits, New York	$1.34	$1.34	$1.82⅝	76.50
Zinc, East St. Louis	17.50	17.50	17.50	10.25
Lead, St. Louis	16.80	16.80	16.80	10.30
Aluminum, virgin	19.00	19.00	19.00	17.00
Nickel, electrolytic	53.55	53.55	53.55	42.97
Magnesium, ingot	24.50	24.50	24.50	20.50
Antimony, Laredo, Tex.	42.00	42.00	42.00	24.50

Composite Prices

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 130 of May 12, 1949, issue.)

	Finished Steel Base Price	Pig Iron	Scrap Steel
Mar. 27, 1951	4.131¢ per lb.	$52.69 per gross ton	$43.00 per gross ton
One week ago	4.131¢ per lb.	52.69 per gross ton	43.00 per gross ton
One month ago	4.131¢ per lb.	52.69 per gross ton	43.00 per gross ton
One year ago	3.837¢ per lb.	46.38 per gross ton	28.58 per gross ton

	Finished Steel Base Price High		Finished Steel Base Price Low		Pig Iron High		Pig Iron Low		Scrap Steel High		Scrap Steel Low	
1951	4.131¢	Jan. 2	4.131¢	Jan. 2	$52.69	Jan. 2	$52.69	Jan. 2	$47.75	Jan. 30	$43.00	Feb. 7
1950	4.131¢	Dec. 1	3.837¢	Jan. 3	52.69	Dec. 12	45.88	Jan. 3	45.13	Dec. 19	26.25	Jan. 3
1949	3.837¢	Dec. 27	3.3705¢	May 3	46.87	Jan. 18	45.88	Sept. 6	43.00	Jan. 4	19.33	June 28
1948	3.721¢	July 27	3.193¢	Jan. 1	46.91	Oct. 12	39.58	Jan. 6	43.16	July 27	39.75	Mar. 9
1947	3.193¢	July 29	2.848¢	Jan. 1	37.98	Dec. 30	30.14	Jan. 7	42.58	Oct. 28	29.50	May 20
1946	2.848¢	Dec. 31	2.464¢	Jan. 1	30.14	Dec. 10	25.37	Jan. 1	31.17	Dec. 24	19.17	Jan. 1
1945	2.464¢	May 29	2.396¢	Jan. 1	25.37	Oct. 23	23.61	Jan. 2	19.17	Jan. 2	18.92	May 22
1944	2.396¢		2.396¢		$23.61		$23.61		19.17	Jan. 11	15.76	Oct. 24
1943	2.396¢		2.396¢		23.61		23.61		$19.17		$19.17	
1942	2.396¢		2.396¢		23.61		23.61		19.17		19.17	
1941	2.396¢		2.396¢		$23.61	Mar. 20	$23.45	Jan. 2	$22.00	Jan. 7	$19.17	Apr. 10
1940	2.30467¢	Jan. 2	2.24107¢	Apr. 16	23.45	Dec. 23	22.61	Jan. 2	21.83	Dec. 30	16.04	Apr. 9
1939	2.35367¢	Jan. 3	2.26689¢	May 16	22.61	Sept. 19	20.61	Sept. 12	22.50	Oct. 3	14.08	May 16
1938	2.58414¢	Jan. 4	2.27207¢	Oct. 18	23.25	June 21	19.61	July 6	15.00	Nov. 22	11.00	June 7
1937	2.58414¢	Mar. 9	2.32263¢	Jan. 4	32.25	Mar. 9	20.25	Feb. 16	21.92	Mar. 30	12.67	June 9
1936	2.32263¢	Dec. 28	2.05200¢	Mar. 10	19.74	Nov. 24	18.73	Aug. 11	17.75	Dec. 21	12.67	June 8
1932	1.89196¢	July 5	1.83910¢	Mar. 1	14.81	Jan. 5	13.56	Dec. 6	8.50	Jan. 12	6.43	July 5
1929	2.31773¢	May 28	2.26498¢	Oct. 29	18.71	May 14	18.21	Dec. 17	17.58	Jan. 29	14.08	Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Inspection station of Magnaflux-Magnaglo Type MAL-3 Unit. Parts are loaded onto unit's endless conveyor and automatically processed with Magnaglo. Pertinent defects show up, marked with a glowing fluorescent indication under black light.

at Studebaker

Semi-Automatic **MAGNAFLUX***
Inspection Unit Saves Up to 32 Inspector-Hours per Shift . . .
100% INSPECTION at PRODUCTION LINE SPEED!

For parts so vital to safety as steering knuckles, knuckle pins and arms, the Studebaker Corporation insists upon 100% inspection. This Magnaflux-Magnaglo* Conveyorized Inspection Unit is more than living up to expectations — *and achieving multiple-savings besides.*

With this Magnaflux-Magnaglo Unit and a two-man team, up to 3800 steering knuckles are inspected per 8-hour shift. This compares with 3600 inspected parts per 6-man team previously . . . and represents a saving of 4 men or 32 man-hours per shift! Similar savings are realized in inspection of other steering components.

In addition, machining time on defective parts is eliminated, and more salvage made possible. Shot-blasting instead of expensive pickling of forgings is now possible, at greatly reduced cost.

Even if your inspection needs are not like those at Studebaker, Magnaflux can in all probability provide the effective answer — and achieve similar savings in man-hours and materials. Invite an experienced Magnaflux Engineer to discuss your problems soon.

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IRON AGE

STEEL PRICES

Smaller numbers in price boxes indicate producing companies. For main office locations, see key on facing page.
Base prices at producing points apply only to sizes and grades produced in these areas. Prices are in cents per lb unless otherwise noted. Extras apply.

	Pittsburgh	Chicago	Gary	Cleveland	Canton Massillon	Middletown	Youngstown	Bethlehem	Buffalo	Conshohocken	Johnstown	Sparrows Point	Granite City	Detroit
INGOTS Carbon forging, net ton	$52.00[1]													
Alloy, net ton	$54.00[1,17]													$54.00[31]
BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton	$56.00[1,8]	$56.00[1]	$56.00[1]						$56.00[3]		$56.00[3]			
Carbon forging billets, net ton	$66.00[1,8]	$66.00[1,4]	$66.00[1]	$66.00[4]	$66.00[4]				$66.00[3,4]	$73.00[26]	$66.00[3]			$69.00[31]
Alloy, net ton	$70.00[1,17,8]	$70.00[1,4]	$70.00[1,8]		$70.00[4]			$70.00[3]	$70.00[3,4]	$77.00[26]	$70.00[3]			$73.00[31]
PIPE SKELP	3.35[1] 3.45[2]						3.35[1,4]							
WIRE RODS	4.10[2] 4.30[18]	4.10[2,4,33]	4.10[8]	4.10[2]			4.10[8]		4.10[84]		4.10[2]	4.20[2]		
SHEETS Hot-rolled (18 ga. & hvr.)	3.60[1,5,9,15] 3.78[38]	3.60[8,23]	3.60[1,8,8]	3.60[4,8]		3.60[7]	3.60[1,4,8] 4.00[13]		3.60[3]	4.00[26]		3.60[3]	4.30[33]	3.80[13] 4.40[47]
Cold-rolled	4.35[1,5,9,15,7]		4.35[1,8,8]	4.35[4,8]		4.35[7]	4.35[4,8]		4.35[3]			4.35[3]	5.05[33]	4.55[13]
Galvanized (10 gage)	4.80[1,9,15]		4.80[1,8]		4.80[4]	4.80[7]	5.50[44] 6.00[84]					4.80[3]	5.80[33]	
Enameling (12 gage)	4.65[1]		4.65[1,8]	4.65[4]		4.65[7]	4.65[8]						5.35[33]	
Long terne (10 gage)	5.20[9,15]		5.20[1]			5.20[7]	6.00[84]							
Hi str. low alloy, h.r.	5.40[1,8] 5.75[9]	5.40[1]	5.40[1,8] 5.90[8]	5.40[4,8]			5.40[1,4,13] 5.90[8]		5.40[3]	5.65[26]		5.40[3]		5.95[13]
Hi str. low alloy, c.r.	6.55[1,8] 8.90[9]		6.55[1,8] 7.05[8]	6.55[4,8]			6.55[4] 7.05[8]		6.55[3]			6.55[3]		7.10[13]
Hi str. low alloy, galv.	7.20[1]											6.75[3]		
STRIP Hot-rolled	3.60[9], 4.00[41,58], 3.75[38] 3.50[5,7]	3.50[66]	3.50[1,8,8]			3.50[7]	3.50[1,4,8] 4.00[13]		3.50[3,4]	3.90[26]	3.50[3]	3.50[3]		4.40[47] 3.80[13]
Cold-rolled	4.65[5,7,9] 5.00[38] 5.35[40,63,66]	4.90[9,66]	4.90[8]	4.65[2,8]		4.65[7]	4.65[4,8] 5.25[48,49] 5.35[13,49]		4.65[3]			4.65[3]		4.85[13] 5.45[47] 5.60[48,81]
Hi str. low alloy, h.r.	5.75[9]		5.50[1] 5.30[8], 5.80[8]				4.95[4], 5.50[1] 5.40[13] 5.80[8]		4.95[3]	5.55[26]		4.95[3]		5.95[13]
Hi str. low alloy, c.r.	7.20[9]			{6.55[2] {6.70[8]			{6.20[4], 6.55[13] {7.05[8]		6.40[3]			6.40[3]		
TINPLATE† Cokes, 1.25-lb base box (1.50 lb, add 25¢)	$8.45[1,5,9,15]		$8.45[1,8,8]				$8.45[4]					$8.55[3]		
Electrolytic 0.25, 0.50, 0.75 lb box	0.25 lb. base box, $7.15[1,4,5,8,9]; $7.25[3,11]; $7.35[23] 0.50 lb., add 25¢; 0.75 lb. add 65¢													
BLACKPLATE, 29 gage Hollowware enameling	5.55[1] 6.15[14]		5.85[1]				5.30[4]							
BARS Carbon steel	3.70[1,5] 3.85[9]	3.70[1,4,33]	3.70[1,4,8,8]	3.70[4]	3.70[4]		3.70[1,4,8]		3.70[3,4]		3.70[3]			3.85[31]
Reinforcing	3.70[1,5]	3.70[4]	3.70[1,8,8]	3.70[4]			3.70[1,4,8]		3.70[3,4]		3.70[3]	3.70[3]		
Cold-finished	4.55[2,4,5,62,69,71]	4.55[2,33,70]	4.55[4,74,75]	4.55[2]	4.55[4,62]		4.55[8,87]		4.60[79]					4.70[84]
Alloy, hot-rolled	4.30[1,17]	4.30[1,4,33]	4.30[1,8,8]		4.30[4]		4.30[1,8]	4.30[8]	4.30[3,4]		4.30[3]			4.45[31] 4.65[13]
Alloy, cold-drawn	5.40[17,62,69,71,2]	5.40[4,33,69,70,73] 5.45[2]	5.40[4,73,74]		5.40[4,62,]		5.40[8,38,87]	5.40[8]	5.40[3]					5.55[84]
Hi str. low alloy, h.r.	5.55[1,5]		5.55[1,8] 6.05[8]	5.55[4,5]			5.55[1] 6.05[8]	5.55[3]	5.55[3]		5.55[3]			
PLATE Carbon steel	3.70[1,5,15] 4.00[9]	3.70[1,23]	3.70[1,8,8]	3.70[4,5]			3.70[1,4,8] 3.95[13]		3.70[3]	4.15[26]	3.70[3]	3.70[3]	4.40[23]	
Floor plates	4.75[1]	4.75[1]	4.75[8]	4.75[2]						4.75[26]				
Alloy	4.75[1]	4.75[1]	4.75[1]				5.20[13]			5.05[26]	4.75[3]	4.75[3]		
Hi str. low alloy	5.65[1,5]	5.65[1]	5.65[1,8] 6.15[8]	5.65[4,5]			{5.85[4] {5.70[13] {6.15[8]			5.90[26]	5.65[3]	5.65[3]		
SHAPES, Structural	3.65[1,5] 3.90[9]	3.65[1,33]	3.65[1,8]					3.70[3]	3.70[3]		3.70[3]			
Hi str. low alloy	5.50[1,5]	5.50[1]	5.50[1,8] 6.00[8]				6.00[8]	5.50[3]	5.50[3]		5.50[3]			
MANUFACTURERS' WIRE Bright	4.85[2,5] 5.10[18]	4.85[2] 4.33,34		4.85[2]			4.85[8]	Kokomo—4.95[30] 4.85[35]			4.85[3]	4.95[3]	Duluth—4.85[2]	
PILING, Steel Sheet	4.45[1]	4.45[1]	4.45[8]						4.45[3]					

STEEL PRICES

Smaller numbers indicate producing companies. See key at right. Prices are in cents per lb unless otherwise noted. Extras apply.

Kansas City	Houston	Birmingham	WEST COAST Seattle, San Francisco, Los Angeles, Fontana		
			F=$79.00[19]		INGOTS Carbon forging, net ton
	$62.00[88]		F=$80.00[19]		Alloy, net ton
		$56.00[11]	F=$75.00[19]		BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton
	$74.00[88]	$66.00[11]	F=$85.00[19] SF, LA, S=$85.00[62]	Geneva=$66.00[16]	Carbon forging billets, net ton
	$78.00[88]		F=$89.00[19] LA=$90.00[62]		Alloy net ton
					PIPE SKELP
	4.50[83]	4.10[4,11]	SF=4.90[3], F=4.90[19] LA=4.90[24,62]	Worcester=4.40[2] Minnequa=4.35[14] Portsmouth=4.30[30]	WIRE RODS
		3.60[4,11]	SF, LA=4.30[24] F=4.55[19]	Niles=5.25[64], Geneva=3.70[16] Ashland=3.60[7]	SHEETS Hot-rolled (18 ga. & hvr.)
		4.35[11]	SF=5.30[24] F=5.30[19]		Cold-rolled
		4.80[4,11]	SF, LA=5.55[24]	Ashland=4.80[7] Kokomo=5.20[30]	Galvanized (10 gage)
				Ashland=4.65[7]	Enameling (12 gage)
					Long ternes (10 gage)
		5.40[11]	F=6.35[19]		Hi str. low alloy, h.r.
			F=7.50[19]		Hi str. low alloy, c.r.
					Hi str. low alloy, galv.
4.10[83]	4.90[83]	3.50[4, 11]	SF, LA=4.25[24,62] F=4.75[19], S=4.50[83]	Atlanta=4.05[65] Minnequa=4.55[14] Ashland=3.50[7]	STRIP Hot-rolled
			F=6.30[19] LA=6.40[37]	New Haven=5.15[3], 5.85[68] Tranton=6.00[43]	Cold-rolled
		5.30[11]	F=6.20[19] SF, LA=6.05[83] S=6.30[62]		Hi str. low alloy, h.r.
			F=8.95[19]		Hi str. low alloy, c.r.
		$8.55[11]	SF=9.20[34]		TINPLATE Cokes, 1.25-lb base box (1.50 lb, add 25¢)
					Electrolytic 0.25, 0.50, 0.75 lb box
					BLACKPLATE, 29 gage Hollowware enameling
4.30[83]	4.10[83]	3.70[4,11]	SF, LA=4.40[24]	Atlanta=4.25[65] Minnequa=4.15[14]	BARS Carbon steel
4.30[83]	4.10[83]	3.70[4,11]	SF, S=4.45[62] F=4.40[19], LA=4.40[83]	Atlanta=4.25[65] Minnequa=4.50[14]	Reinforcing
			LA=6.00[4]	Newark=5.00[69] Putnam=5.10[93] Hartford=5.10[4]	Cold-finished
4.90[83]	4.70[83]		LA=5.35[83] F=5.35[19]		Alloy, hot-rolled
				Newark=5.75[69] Worcester=5.75[2] Hartford=5.85[4]	Alloy, cold-drawn
		5.55[11]	F=6.60[19] SF, S=6.30[62] LA=6.25[62]		Hi str. low alloy, h.r.
	4.10[83]	3.70[4,11]	F=4.30[19] S=4.60[62]	Claymont=4.15[39] Coatesville=4.15[21] Minnequa=4.50[14] Geneva=3.70[16]	PLATE Carbon steel
				Harrisburg=5.25[35]	Floor plates
			F=5.70[19]	Coatesville=5.25[21] Claymont=4.85[39]	Alloy
		5.65[11]	F=6.25[19] S=6.55[62]	Geneva=5.65[16]	Hi str. low alloy
4.25[83]	4.05[83]	3.60[4] 3.55[11]	SF=4.20[62] F=4.25[19] LA=4.25[24,62] S=4.30[83]	Geneva 3.65[16] Minnequa 4.10[14]	SHAPES, Structural
		5.50[11]	S,F=6.10[62,19] SF=6.00[62] LA=6.05[62]	Geneva=5.50[16]	Hi str. low alloy
5.45[83]	5.25[83]	4.85[4,11]	SF, LA=5.80[24]	Atlanta=5.10[65] Worcester=5.15[2] Minnequa=5.10[14] Portsmouth=5.25[30]	MANUFACTURERS' WIRE Bright

KEY TO STEEL PRODUCERS

1 U. S. Steel Co., Pittsburgh
2 American Steel & Wire Co., Cleveland
3 Bethlehem Steel Co., Bethlehem
4 Republic Steel Corp., Cleveland
5 Jones & Laughlin Steel Corp., Pittsburgh
6 Youngstown Sheet & Tube Co., Youngstown
7 Armco Steel Corp., Middletown, Ohio
8 Inland Steel Co., Chicago
9 Weirton Steel Co., Weirton, W. Va.
10 National Tube Co., Pittsburgh
11 Tennessee Coal, Iron & R. R. Co., Birmingham
12 Great Lakes Steel Corp., Detroit
13 Sharon Steel Corp., Sharon, Pa.
14 Colorado Fuel & Iron Corp., Denver
15 Wheeling Steel Corp., Wheeling, W. Va.
16 Geneva Steel Co., Salt Lake City
17 Crucible Steel Co. of America, New York
18 Pittsburgh Steel Co., Pittsburgh
19 Kaiser Steel Corp., Oakland, Calif.
20 Portsmouth Div., Detroit Steel Corp., Detroit
21 Lukens Steel Co., Coatesville, Pa.
22 Granite City Steel Co., Granite City, Ill.
23 Wisconsin Steel Co., South Chicago, Ill.
24 Columbia Steel Co., San Francisco
25 Copperweld Steel Co., Glassport, Pa.
26 Alan Wood Steel Co., Conshohocken, Pa.
27 Calif. Cold Rolled Steel Corp., Los Angeles
28 Allegheny Ludlum Steel Corp., Pittsburgh
29 Claymont Steel Corp., Claymont, Del.
30 Continental Steel Corp., Kokomo, Ind.
31 Rotary Electric Steel Co., Detroit
32 Laclede Steel Co., St. Louis
33 Northwestern Steel & Wire Co., Sterling, Ill.
34 Keystone Steel & Wire Co., Peoria, Ill.
35 Central Steel & Wire Co., Harrisburg, Pa.
36 Carpenter Steel Co., Reading, Pa.
37 Eastern Stainless Steel Corp., Baltimore
38 Washington Steel Corp., Washington, Pa.
39 Jessop Steel Co., Washington, Pa.
40 Blair Strip Steel Co., New Castle, Pa.
41 Superior Steel Corp., Carnegie, Pa.
42 Timken Steel & Tube Div., Canton, Ohio
43 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
44 Reeves Steel & Mfg. Co., Dover, Ohio
45 John A. Roebling's Sons Co., Trenton, N. J.
46 Simonds Saw & Steel Co., Fitchburg, Mass.
47 McLouth Steel Corp., Detroit
48 Cold Metal Products Co., Youngstown
49 Thomas Steel Co., Warren, Ohio
50 Wilson Steel & Wire Co., Chicago
51 Sweet's Steel Co., Williamsport, Pa.
52 Superior Drawn Steel Co., Monaca, Pa.
53 Tremont Nail Co., Wareham, Mass.
54 Firth Sterling St. & Carbide Corp., McKeesport
55 Ingersoll Steel Div., Chicago
56 Phoenix Iron & Steel Co., Phoenixville, Pa.
57 Fitzsimons Steel Co., Youngstown
58 Stanley Works, New Britain, Conn.
59 Universal-Cyclops Steel Corp., Bridgeville, Pa.
60 American Cladmetals Co., Carnegie, Pa.
61 Cuyahoga Steel & Wire Co., Cleveland
62 Bethlehem Pacific Coast Steel Corp., San Fran.
63 Follansbee Steel Corp., Pittsburgh
64 Niles Rolling Mill Co., Niles, Ohio
65 Atlantic Steel Co., Atlanta
66 Acme Steel Co., Chicago
67 Joslyn Mfg. & Supply Co., Chicago
68 Detroit Steel Corp., Detroit
69 Wycoff Steel Co., Pittsburgh
70 Bliss & Laughlin, Inc., Harvey, Ill.
71 Columbia Steel & Shafting Co., Pittsburgh
72 Cumberland Steel Co., Cumberland, Md.
73 La Salle Steel Co., Chicago
74 Monarch Steel Co., Inc., Hammond, Ind.
75 Empire Steel Co., Mansfield, Ohio
76 Mahoning Valley Steel Co., Niles, Ohio
77 Oliver Iron & Steel Co., Pittsburgh
78 Pittsburgh Screw & Bolt Co., Pittsburgh
79 Standard Forging Corp., Chicago
80 Driver Harris Co., Harrison, N. J.
81 Detroit Tube & Steel Div., Detroit
82 Reliance Div., Eaton Mfg. Co., Massillon, Ohio
83 Sheffield Steel Corp., Kansas City
84 Plymouth Steel Co., Detroit
85 Wickwire Spencer Steel, Buffalo
86 Angell Nail and Chaplet, Cleveland
87 Mid-States Steel & Wire, Crawfordsville, Ind.
88 National Supply, Pittsburgh, Pa.
89 Wheatland Tube Co., Wheatland, Pa.
90 Mercer Tube & Mfg. Co., Sharon, Pa.
91 Woodward Iron Co., Woodward, Ala.
92 Sloss-Sheffield Steel & Iron Co., Birmingham
93 Hanna Furance Corp., Detroit
94 Interlake Iron Corp., Cleveland
95 Lone Star Steel Co., Dallas
96 Mystic Iron Works, Everett, Mass.
97 Jackson Iron & Steel Co., Jackson, O.
98 Globe Iron Co., Jackson, O.
99 Pittsburgh Coke & Chemical Co., Pittsburgh
100 Shenango Furnace Co., Pittsburgh
101 Tennessee Products & Chem. Corp., Nashville
102 Koppers Co., Inc., Granite City, Ill.
103 Page Steel & Wire Div., American Chain & Cable., Monessen, Pa.
104 Wallingford Steel Co., Wallingford, Conn.

STAINLESS STEELS

Base price, cents per lb, f.o.b. mill.

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	14.25	15.00	16.50	16.00	24.25	19.75	21.50	12.75	14.75	13.00
Slabs, billets rerolling	18.50	19.75	21.75	20.75	31.75	26.00	28.25	16.50	20.00	16.75
Forg. discs, die blocks, rings	34.00	34.00	36.50	35.50	52.50	40.00	44.50	28.00	28.50	28.50
Billets, forging	26.25	26.25	28.25	27.50	41.00	31.00	34.75	21.50	22.00	22.00
Bars, wires, structurals	31.25	31.25	33.75	32.75	48.75	36.75	41.25	25.75	26.25	26.25
Plates	33.00	33.00	35.00	35.00	51.50	40.50	45.00	27.00	27.50	27.50
Sheets	41.00	41.00	43.00	43.00	56.50	49.00	53.50	36.50	37.00	39.00
Strip, hot-rolled	28.50	28.00	32.25	30.00	48.25	36.75	41.00	23.50	30.25	24.00
Strip, cold-rolled	34.00	36.50	40.00	38.50	58.50	48.00	52.00	30.50	37.00	31.00

STAINLESS STEEL PRODUCING POINTS—*Sheets:* Midland, Pa., 17; Brackenridge, Pa., 28; Butler, Pa., 7; McKeesport, Pa., 1; Washington, Pa., 38 (type 316 add 5¢), 39; Baltimore, 37; Middletown, Ohio, 7; Massillon, Ohio, 4; Gary, 1; Bridgeville, Pa., 59; New Castle, Ind., 55; Ft. Wayne, Ind., 67; Lockport, N. Y., 45.

Strip: Midland, Pa., 17; Cleveland, 2; Carnegie, Pa., 41; McKeesport, Pa., 54; Reading, Pa., 36; Washington, Pa., 38 (type 316 add 5¢); W. Leechburg, Pa., 28; Bridgeville, Pa., 59; Detroit, 47; Massillon, Canton, Ohio, 4; Middletown, Ohio, 7; Harrison, N. J., 80; Youngstown, 48; Lockport, N. Y., 46; New Britain, Conn., 58; Sharon, Pa., 13; Butler, Pa., 7; Wallingford, Conn., 104.

Bars: Baltimore, 7; Duquesne, Pa., 1; Munhall, Pa., 1; Reading, Pa., 36; Titusville, Pa., 59; Washington, Pa., 39; McKeesport, Pa., 1, 54; Bridgeville, Pa., 59; Dunkirk, N. Y., 28; Massillon, Ohio, 4; Chicago, 1; Syracuse, N. Y., 17; Watervliet, N. Y., 28; Waukegan, Ill., 2; Lockport, N. Y., 46; Canton, Ohio, 42; Ft. Wayne, Ind., 67.

Wire: Waukegan, Ill., 2; Massillon, Ohio, 4; McKeesport, Pa., 54; Bridgeport, Conn., 44; Ft. Wayne, Ind., 67; Trenton, N. J., 45; Harrison, N. J., 80; Baltimore, 7; Dunkirk, 28; Monessen, 103; Syracuse, N. Y., 17; Bridgeville, Pa., 59.

Structurals: Baltimore, 7; Massillon, Ohio, 4; Chicago, 1, 67; Watervliet, N. Y., 28; Bridgeport, Conn., 44; Syracuse, N. Y., 17.

Plates: Brackenridge, Pa., 28 (type 416 add ½¢); Butler, Pa., 7; Chicago, 1; Munhall, Pa., 1; Midland, Pa., 17; New Castle, Ind., 55; Lockport, N. Y., 46; Middletown, 7; Washington, Pa., 39; Cleveland, Massillon, 4.

Forged discs, die blocks, rings: Pittsburgh, 1, 17; Syracuse, 17; Ferndale, Mich., 28; Washington, Pa., 39.

Forging billets: Midland, Pa., 17; Baltimore, 7; Washington, Pa., 39; McKeesport, 54; Massillon, Canton, Ohio, 4; Watervliet, 28; Pittsburgh, Chicago, 1; Syracuse, N. Y., 17.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Axles	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer-1	3.60	4.00	4.70					
Chicago-4				6.15				
Ensley-11	3.60	4.00						
Fairfield-11		4.00	4.40			8.60	4.50	
Gary-1	3.60	4.00					4.50	
Ind. Harbor-8	3.60		4.70	6.15	5.60	8.60	4.50	
Johnstown-3		4.00			5.60	8.60		
Joliet-1		4.00	4.70					
Kansas City-83				6.40				9.85
Lackawanna-3	3.60	4.00	4.70			8.60	4.50	
Lebanon-3				6.15				9.85
Minnequa-14	3.60	4.50	4.70	6.15		8.60	4.50	9.85
Pittsburgh-77						9.35		9.85
Pittsburgh-78								9.85
Pittsburgh-5				6.15				
Pittsburg-24							4.65	
Seattle-62				6.65			4.65	
Steelton-3	3.60		4.70				4.50	
Struthers-6				6.15				
Torrance-24							4.65	
Youngstown-4				6.15				

BOILER TUBES

$ Per 100 ft., cut, 10 to 24 ft.

F.o.b. Mill	Size		Seamless		Elec. Weld	
	Od-In.	B. W. Ga.	H. R.	C.D.	H. R.	C.D.
Babcock & Wilcox	2	13	22.67	26.66	21.99	25.86
	2½	12	30.48	35.84	29.57	34.78
	3	12	33.90	39.90	32.89	38.70
	3½	11	42.37	49.89	41.10	48.39
	4	10	52.60	61.88	51.03	60.02
National Tube	2	13	21.62	26.48		
	2½	12	29.65	36.32		
	3	12	34.00	41.64		
	3½	11	40.34	49.41		
	4	10	51.21	62.72		
Pittsburgh Steel	2	13		27.08		
	2½	12	30.49	37.15		
	3	12	34.95	42.59		
	3½	11	41.48	50.54		
	4	10	52.65	64.16		

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Base Col.	Woven Wire Fence 9-15½ ga. Base Col.	Fence Posts Base Col.	Single Loop Bale Ties Base Col.	Twisted Barbless Wire Base Col.	Galv. Barbed Wire Base Col.	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. (1) ¢/lb.
Alabama City-4	118	126		123		136	5.70	5.95
Aliquippa, Pa.-5	118	132			136	140	5.70	6.15
Atlanta-65	121	133		126	126	143	5.95	6.40
Bartonville-34	118	130		123	143	143	5.70	6.15
Buffalo-85							4.85	
Cleveland-86	125							
Cleveland-2							5.70	6.15
Crawfordsville-87		132				145	5.95	6.40
Donora, Pa.-2	118	130		123	140	140	5.70	6.15
Duluth-2	118	130		123	140	140	5.70	6.15
Fairfield, Ala.-11	118	130		123		140	5.70	6.15
Houston-83	126	138				148	6.10	6.55
Johnstown, Pa.-3	118	130			140		5.70	6.15
Joliet, Ill.2	118	130		123		140	5.70	6.15
Kokomo, Ind.-30	120	132		125	138	142	5.80	6.05
Los Angeles-62							6.65	
Kansas City-83	130			135		152	6.30	6.75
Minnequa-14	123	138	130	128	148	146	5.95	6.45
Monessen-18	124	135				145	5.95	6.40
Moline, Ill.-4			136					
Pittsburg, Cal.-24	137			147	156	160	6.65	6.80
Portsmouth-20	124	137			147	147	6.10	6.60
Rankin, Pa.-2	118	130			140	140	5.70	6.15
So. Chicago, Ill.-4	118	128	140	123		136	5.70	5.95
S. San Fran.-14				147		160	6.65	7.10
Sparrows Pt.-3	120			125	142	142	5.80	6.25
Sterling, Ill.-33	118	130		123	140	140	5.70	6.15
Struthers, Ohio-6							5.70	6.15
Torrance, Cal.-24	138						6.65	
Worcester-2	124						6.00	6.45
Williamsport, Pa.-51			150					

Cut Nails, carloads, base, $7.35 per 100 lb. (less 20¢ to jobbers), at Conshohocken, Pa., (28). Wheeling, W. Va., (15)., $7.15.

(1) Alabama City and So. Chicago do not include zinc extra.

CAST IRON WATER PIPE

Per Net Ton

6 to 24-in., del'd Chicago. $105.30 to $108.80
6 to 24-in., del'd N. Y. .... 108.50 to 109.50
6 to 24-in., Birmingham. 91.50 to 96.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less .....$108.50 to $113.00
Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

FLUORSPAR

Washed gravel, f.o.b. Rosiclaire, Ill. Price, net ton: Effective CaF_2 content:
70% or more.....$43.00
60% or less..... 40.00

PIPE AND TUBING

Base discounts, f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS					
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½-3 In.		3½-4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
STANDARD T. & C.																				
Sparrows Pt.-3	34.0	12.0	37.0	16.0	39.5	19.5	40.0	20.0	40.5	21.0	41.0	21.5	41.5	22.0						
Cleveland-4	36.0	14.0	39.0	18.0	41.5	21.5	42.9	22.0	42.5	23.0	43.0	23.5	43.5	24.0						
Oakland-19	25.0	3.0	28.0	7.0	30.5	10.5	31.0	11.0	31.5	12.0	32.0	12.5	32.5	13.0						
Pittsburgh-5	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.5	8.0	32.5	11.5	34.5	13.5
Pittsburgh-10	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
St. Louis-32	35.0	13.0	38.0	17.0	40.5	20.5	41.0	21.0	41.5	22.0	42.0	22.5	42.5	23.0						
Sharon-90	36.0	13.0	39.0	17.0	41.5	20.0	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.0						
Pittsburgh-88	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5		32.5		34.5	
Wheeling-15	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0						
Wheatland-89	36.0	14.0	39	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5						
Youngstown-6	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
EXTRA STRONG, PLAIN ENDS																				
Sparrows Pt.-3	33.5	13.0	37.5	17.0	39.5	20.5	40.0	21.0	40.5	22.0	41.0	22.5	41.5	23.0						
Cleveland-4	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0						
Oakland-19	24.5	4.0	28.5	8.0	30.5	11.5	31.0	12.0	31.5	13.0	32.0	13.5	32.5	14.0						
Pittsburgh-5	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.0	7.5	33.0	12.0	36.5	15.5
Pittsburgh-10	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0	14.0	36.5	17.5
St. Louis-32	34.5	14.0	38.5	18.0	40.5	21.5	41.0	22.0	41.5	23.0	42.0	23.5	42.5	24.0						
Sharon-90	35.5	14.0	39.5	18.0	41.5	21.0	42.0	21.5	42.5	22.0	43.0	22.5	43.5	23.0						
Pittsburgh-88	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0		33.0		36.5	
Wheeling-15	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0						
Wheatland-89	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43 5	22.5						
Youngstown-6	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0	14.0	36.5	17.5

Galvanized discounts based on zinc at 17¢ per lb. East St. Louis. For each 1¢ change in zinc, discounts vary as follows: ½ in., ¾ in., and 1 in., 1 pt.; 1¼ in., 1½ in., 2 in., ¾ pt.; 2½ in., 3 in., ½ pt. Calculate discounts on even cents per lb of zinc, i.e., if zinc is 16.51¢ to 17.50¢ per lb. use 17¢. Jones & Laughlin discounts apply only when zinc price changes 1¢.

Threads only, buttweld and seamless, 1 pt. higher discount. Plain ends, buttweld and seamless, 3 in. and under, 3½ pts. higher discount. Buttweld jobbers' discount, 5 pct.

WAREHOUSES

Base price, f.o.b., dollars per 100 lb. *(Metropolitan area delivery add 20¢ except Birmingham, San Francisco, Cincinnati, New Orlean, St. Paul, add 15¢; Memphis, add 10¢; Philadelphia, add 25¢; New York, add 30¢).

Cities	Sheets			Strip		Plates	Shapes	Bars		Alloy Bars			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled A 4615 As rolled	Hot-Rolled A 4140 Annealed	Cold-Drawn A 4615 As rolled	Cold-Drawn A 4140 Annealed
Baltimore	5.60	6.84	7.49[2]–8.07	6.04	.....	5.80	6.14	6.04	6.84–6.89	10.24	10.54	11.89	12.19
Birmingham*	5.60	6.40	6.75	5.55	.....	5.95	5.70	5.55	.....	.....	.....	.....	.....
Boston	6.20	7.00–7.25	7.74–8.29	6.15	8.50[4]	6.48–6.78	6.20	6.05	6.79–6.84	10.25	10.55	11.90–12.00	12.20–12.30
Buffalo	5.60	6.40	7.74–8.09	5.86	.....	6.05	5.80	5.60	6.40–6.45	10.15–10.85	10.45	11.80	11.95–12.10
Chicago	5.60	6.40	7.76	5.55	.....	5.80	5.70	5.55	6.30	9.80	10.10	11.45	11.75
Cincinnati*	5.87	6.44	7.39	5.80	.....	6.19	6.09	5.80	6.61	10.15	10.45	11.80	12.10
Cleveland	5.60	6.40	8.10	5.69	6.90	5.92	5.82	5.57	6.40	9.91	10.21	11.56	11.86
Detroit	5.78	6.53	7.89	5.94	.....	5.99	6.09	5.84	6.56	10.11	10.41	11.76	12.06
Houston	7.00	8.25	.....	.....	.....	6.85	6.50	6.85	9.35	10.35	11.25	.....	12.75
Indianapolis, del'd	6.00	6.80	8.15	5.95	.....	6.20	6.10	5.95	6.80	.....	.....	.....	.....
Kansas City	6.00	6.80	7.45	6.15	7.50	6.40	6.30	6.15	7.00	10.40	10.70	12.05	12.35
Los Angeles	6.35	7.90	8.85	6.40	9.45[5]	6.40	6.35	6.35	8.20	11.30	11.30	13.20	13.50
Memphis*	6.33–6.38	7.08–7.18	.....	6.33–6.38	.....	6.43–8.02	6.33–6.48	6.08–6.33	7.16–7.32	.....	.....	.....	.....
Milwaukee	5.74	6.54	7.89	5.69–6.59	.....	5.94	5.84	5.69	6.44–6.54	9.94	10.24	11.59	11.89
New Orleans*	5.70	6.59	.....	5.75	7.25	5.95	5.75	5.75	7.30	.....	.....	.....	.....
New York*	5.67–5.97	7.19[5]–7.24[1]	8.14[2]	6.29–6.89	8.63[4]	6.26–6.58	6.10	6.12	6.99	10.05–10.15	10.35–10.45	11.70–11.80	12.10–12.20
Norfolk	6.50[3]	.....	.....	.....	.....	6.50[3]	6.60[3]	6.55[3]	.....	.....	.....	.....	.....
Philadelphia*	5.90	6.80	8.00	6.10	.....	6.05	5.90	6.05	6.86	9.90	10.20	.....	.....
Pittsburgh	5.60	6.40	7.75	5.65–5.95	.....	5.75	5.70	5.55	6.15	9.80	10.10	11.45	11.75
Portland	6.60–7.55	8.95	8.50–9.10	7.30	.....	6.80	6.95	6.90	.....	.....	12.15	.....	.....
Salt Lake City	7.95	.....	9.70–10.50[2]	8.70–8.75	.....	8.05	6.75–8.30	7.95–8.65	9.00	.....	.....	.....	.....
San Francisco*	6.65	8.05[2]	8.55–8.90[2]	6.60	9.45[5]	6.50	6.45	6.45	8.20	11.30	11.30	13.20	13.20–13.50
Seattle	7.05	8.60	9.20	9.05	.....	6.75	6.65	6.75	9.05	.....	.....	.....	.....
St. Louis	5.80–5.85	6.65	8.00	5.80	8.00[4]–8.28	6.13	6.03	5.80	6.55–6.65	10.05	10.35	11.70	12.00
St. Paul*	6.16	6.96	8.31	6.11	.....	6.38	6.26	6.11	6.96	10.36	10.66	12.01	12.31

BASE QUANTITIES (Standard unless otherwise keyed): Cold finished bars; 2000 lb or over. Alloy bars; 1000 to 1999 lb. All others; 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets, for quantity.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 400 to 1999 lb; (4) 6000 lb and over; (5) 1500 to 9999 lb; (6) 2000 to 5999 lb.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Blast Furnace Silvery	Low Phos. Charcoal
Bethlehem-3	54.00	54.50	55.00	55.50	.....	.....	.....
Birmingham-4	48.38	48.88	.....	.....	.....	.....	.....
Birmingham-91	48.38	48.88	.....	.....	.....	.....	.....
Birmingham-92	48.38	48.88	.....	.....	.....	.....	.....
Buffalo-4	52.00	52.50	53.00	.....	.....	.....	.....
Buffalo-93	52.00	52.50	53.00	.....	.....	63.75	.....
Chicago-94	52.00	52.50	52.50	53.00	.....	.....	.....
Cleveland-2	52.00	52.50	52.50	53.00	57.00	.....	.....
Cleveland-4	52.00	52.50	52.50	.....	.....	.....	.....
Daingerfield, Tex.-95	48.00	48.50	48.50	.....	.....	.....	.....
Duluth-94	52.00	52.50	52.50	53.00	.....	.....	.....
Erie-94	52.00	52.50	52.50	53.00	.....	.....	.....
Everett, Mass.-96	.....	53.25	53.75	.....	.....	.....	.....
Fontana-19	58.00	58.50	.....	.....	.....	.....	.....
Geneva, Utah-16	52.00	52.50	52.50	53.00	.....	.....	.....
Granite City, Ill.-102	53.90	54.40	54.90	.....	.....	.....	.....
Hubbard, Ohio-6	52.00	52.50	52.50	.....	.....	.....	.....
Ironton, Utah-16	52.00	52.50	.....	.....	.....	.....	.....
Jackson, Ohio-97, 98	.....	.....	.....	.....	.....	62 50	.....
Lyle, Tenn.-101	.....	.....	.....	.....	.....	.....	66.00
Monessen-18	54.00	.....	.....	.....	.....	.....	.....
Neville Island-99	52.00	52.50	52.50	53.00	.....	.....	.....
Pittsburgh-1	52.00	.....	.....	53.00	.....	.....	.....
Sharpsville-100	52.00	52.50	52.50	53.00	.....	.....	.....
Steelton-3	54.00	54.50	55.00	55.50	60.00	.....	.....
Swedeland-28	56.00	56.50	57.00	57.50	.....	.....	.....
Toledo-94	52.00	52.50	52.50	53.00	.....	.....	.....
Troy, N. Y.-4	54.00	54.50	55.00	.....	60.00	.....	.....
Youngstown-6	52.00	52.50	52.50	53.00	.....	.....	.....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct). 50¢ per ton for each 0.50 pct manganese over 1 pct. $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus content over 0.70 pct. Silvery iron: Add $1.50 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. $1 per ton for 0.75 pct or more phosphorus, manganese as above. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

REFRACTORIES

Fire Clay Brick (*F.o.b. works*) *Carloads, Per 1000*

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5) $94.60
No. 1 Ohio 88.00
Sec. quality, Pa., Md., Ky., Mo., Ill. 88.00
No. 2 Ohio 79.20
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50) 13.75

Silica Brick

Mt. Union, Pa., Ensley, Ala. $94.60
Childs, Pa. 99.00
Hays, Pa. 100.10
Chicago District 104.50
Western Utah and Calif. 111.10
Super Duty, Hays, Pa., Athens, Tex., Chicago 111.10
Silica cement, net ton, bulk, Eastern (except Hays, Pa.) 16.50
Silica cement, net ton, bulk, Hays, Pa. 18.70
Silica cement, net ton, bulk, Ensley, Ala. 17.60
Silica cement, net ton, bulk, Chicago District 17.60
Silica cement, net ton, bulk, Utah and Calif. 24.70

Chrome Brick *Per Net Ton*

Standard chemically bonded, Balt., Chester $82.00

Magnesite Brick

Standard, Baltimore $104.00
Chemically bonded, Baltimore 93.00

Grain Magnesite *St. ⅝-in. grains*

Domestic, f.o.b. Baltimore, in bulk fines removed $62.70
Domestic, f.o.b. Chewelah, Wash., in bulk 36.30
in sacks 41.80

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢ $13.00

COKE

	Net Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$14.50 to $15.00
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$17.50 to $18.00
Foundry, oven coke	
Buffalo, del'd	$26.69
Chicago, f.o.b.	23.00
Detroit, f.o.b.	24.00
New England, del'd	24.80
Seaboard, N. J., f.o.b.	22.75
Philadelphia, f.o.b.	22.70
Swedeland, Pa., f.o.b.	22.60
Painesville, Ohio, f.o.b.	24.00
Erie, Pa., f.o.b.	23.50
Cleveland, del'd	25.72
Cincinnati, del'd	25.06
St. Paul, f.o.b.	22.50
St. Louis	25.40
Birmingham, del'd	21.69
Neville Island	23.00

LAKE SUPERIOR ORES

(51.50% *Fe; natural content, delivered lower lake ports*)	*Per gross ton*
Old range, bessemer	$8.70
Old range, nonbessemer	8.55
Mesabi, bessemer	8.45
Mesabi, nonbessemer	8.30
High phosphorus	8.30

After adjustments for analyses, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in lake vessel rates, upper lake rail freights, dock handling charges and taxes thereon.

C-R SPRING STEEL

F.o.b. Mill Cents Per Lb.	CARBON CONTENT				
	0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Bridgeport, Conn.-58	5.35	6.80	7.40	9.35	11.65
Carnegie, Pa.-41	.....	6.80	7.40	9.35	11.65
Cleveland-2	4.65	6.45	7.40	9.35	11.65
Detroit-68	5.80	6.85	7.25	.....	.....
New Castle, Pa.-40	5.35	6.80	7.40	9.35	.....
New Haven, Conn.-68	5.85	6.75	7.35	.....	.....
Sharon, Pa.-13	5.35	6.80	7.40	9.35	11.65
Weirton, W. Va.-9	5.35	6.80	7.40	9.35	11.65
Worcester, Mass.-2	4.95	6.75	7.70	9.65	11.65
Youngstown-48	.....	6.80	7.40	9.35	11.65

ARDCOR TUBING ROLLS

★ These Tubing Rolls, made of ARDCORLOY*—a special alloy steel, were designed and manufactured by ARDCOR for one of America's leading Welded Tube Manufacturers (name on request).
* PRODUCTION PROVEN—30% more footage!

What are YOUR Roll Forming Requirements?

—ARDCOR SPECIALTIES—

ARDCORLOY ROLLER DIES • ROLL FORMING MACHINERY • FLYING SHEAR AND CUT-OFF MACHINES • CRADLE REELS • SPECIAL PRODUCTION MACHINERY.

American ROLLER DIE CORPORATION
20650 St. Clair Avenue ● Cleveland 17, Ohio

Another Load GOES UP Another Equipment Builder STANDARDIZES ON WISCONSIN ENGINES

Hauling as much as 2500 lb. loads STRAIGHT UP at 178 f.p.m. takes dependable power. And the hoist of this Portable Builders' Tower, built by Clyde Iron Works, and powered by a Wisconsin Heavy-Duty Air-Cooled Engine, delivers it.

Builders and buyers of equipment naturally STANDARDIZE on Wisconsin Engines, especially where you need a steady pull on a long haul. For example, tapered roller bearings at both ends of the crankshaft eliminate radial and end thrusts. And, you have no cooling troubles, because of fool-proof air-cooling at its best in any weather.

An OUTSIDE magneto with impulse coupling delivers sure-fire starting at slower cranking speed. Heavy-duty construction throughout assures you of heavy-duty service year in and year out . . . and more profit in every contract.

4-cycle single-cylinder, 2-cylinder, and V-type 4-cylinder models, 3 to 30 hp. Write for information.

WISCONSIN MOTOR CORPORATION
World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 46, WISCONSIN

BOLTS, NUTS, RIVETS, SCREWS

Consumer Prices

(Base discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

	Pct Off List Less Case	C.
½ in. & smaller x 6 in. & shorter	15	28½
9/16 in. & ⅝ in. x 6 in. & shorter	18½	30½
¾ in. & larger x 6 in. & shorter	17½	29½
All diam. longer than 6 in.	14	27½
Lag, all diam. x 6 in. & shorter	23	35
Lag, all diam. longer than 6 in.	21	33
Plow bolts	34	....

Nuts, Hot Pressed, Cold Punched—Sq

	Pct Off List Less Keg (Reg.)	K.	Less Keg (Hvy.)	K.
½ in. & smaller	15	28½	15	28½
9/16 in. & ⅝ in.	12	25	6½	21
¾ in. to 1½ in. inclusive	9	23	1	16½
1⅝ in. & larger	7½	22	1	16½

Nuts, Hot Pressed—Hexagon

½ in. & smaller	26	37	22	34
9/16 in. & ⅝ in.	16½	29½	6½	21
¾ in. to 1½ in. inclusive	12	25	2	17½
1⅝ in. & larger	8½	23	2	17½

Nuts, Cold Punched—Hexagon

½ in. & smaller	26	37	22	34
9/16 in. & ⅝ in.	23	35	17½	30½
¾ in. to 1½ in. inclusive	19½	31½	12	25
1⅝ in. & larger	12	25	6½	21

Nuts, Semi-Finished—Hexagon

	Reg.		Hvy.	
½ in. & smaller	35	45	28½	39½
9/16 in. & ⅝ in.	29½	40½	22	34
¾ in. to 1½ in. inclusive	24	36	15	28½
1⅝ in. & larger	13	26	8½	23

	Light	
7/16 in. & smaller	35	45
½ in. thru ⅝ in.	28½	39½
¾ in. to 1½ in. inclusive	26	37

Stove Bolts *Pct Off List*

Packaged, steel, plain finished	56—10
Packaged, plated finish	41—10
Bulk, plain finish**	67*

*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

**Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Rivets *Base per 100 lb.*

½ in. & larger	$7.35
	Pct Off List
7/16 in. & smaller	36

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham, Lebanon, Pa.

Cap and Set Screws

(In bulk)	Pct Off List
Hexagon head cap screws, coarse or fine thread, ¼ in. thru ⅝ in. x 6 in., SAE 1020, bright	54
¾ in. thru 1 in. up to & including 6 in.	48
¼ in. thru ⅝ in. x 6 in. & shorter high C double heat treat	46
¾ in. thru 1 in. up to & including 6 in.	41
Milled studs	35
Flat head cap screws, listed sizes	16
Fillister head cap, listed sizes	34
Set screws, sq head, cup point, 1 in. diam. and smaller x 6 in. & shorter	53

S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carloads	27.75
Ton lots	30.05
Less ton lots	31.85

ELECTRODES

Cents per lb., f.o.b. plant, threaded electrodes with nipples, unboxed

Diam. in in.	Length in in.	Cents Per lb.
	GRAPHITE	
17, 18, 20	60, 72	17.85
8 to 16	48, 60, 72	17.85
7	48, 60	19.57
6	48, 60	20.95
4, 5	40	21.50
3	40	22.61
3½	24, 30	23.15
2	24, 30	25.36
	CARBON	
40	100, 110	8.03
35	65, 110	8.03
30	65, 84, 110	8.03
24	72 to 104	8.03
20	84, 90	8.03
17	60, 72	8.03
14	60, 72	8.57
10, 12	60	8.84
8	60	9.10

CLAD STEEL

Base prices, cents per pound, f.o.b. mill

Stainless-carbon	Plate	Sheet
No. 304, 20 pct,		
Coatesville, Pa. (21)..	*29.5	
Washgtn, Pa. (39)....	*29.5	
Claymont, Del. (29)...	*28.00	
Conshohocken, Pa. (26)		*24.00
New Castle, Ind. (55).	*26.50	*25.50
Nickel-carbon		
10 pct Coatesville (21)..	32.5	
Inconel-carbon		
10 pct Coatesville (21)..	40.5	
Monel-carbon		
10 pct Coatesville (21)..	33.5	
No. 302 Stainless-copper-stainless, Carnegie, Pa. (60)		77.00
Aluminized steel sheets, hot dip, Butler, Pa. (7).....		7.75

*Includes annealing and pickling, or sandblasting.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.235
18	4	1	—	5	$1.36
18	4	2	—	—	$1.38
1.5	4	1.5	8	—	78.5¢
6	4	2	6	—	.87¢

High-carbon chromium ..... 63.5¢
Oil hardened manganese..... 35¢
Special carbon ..... 32.5¢
Extra carbon ..... 27¢
Regular carbon ..... 23¢

Warehouse prices on and east of Mississippi are 3¢ per lb higher. West of Mississippi, 5¢ higher.

METAL POWDERS

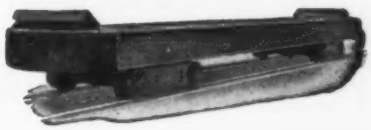
Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags... 7.4¢ to 9.0¢
Canadian sponge iron, del'd, in East ..... 10.00¢
Domestic sponge iron, 98+% Fe, carload lots ..... 9.0¢ to 15.0¢
Electrolytic iron, annealed, 99.5+% Fe ..... 36.0¢ to 39.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe 48.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe. 63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe 83.0¢ to $1.48
Aluminum ..... 29.00¢
Brass, 10 ton lots .....30.00¢ to 33.25¢
Copper, electrolytic..10.75¢ plus metal value
Copper, reduced ...10.00¢ plus metal value
Cadmium, 100-199 lb..95¢ plus metal value
Chromium, electrolytic, 99% min., and quantity $3.50
Lead .....7.5¢ to 12.0¢ plus metal value
Manganese ..... 52.00¢
Molybdenum, 99% $2.65
Nickel, unannealed ..... 88.0¢
Nickel, annealed ..... 95.0¢
Nickel, spherical, unannealed 92.0¢
Silicon ..... 38.5¢
Solder powder..6.5¢ to 8.5¢ plus met. value
Stainless steel, 302 ..... 83.00¢
Stainless steel, 316..... $1.10
Tin .....14.00¢ plus metal value
Tungsten, 99% $4.15
Zinc, 10 ton lots.....23.0¢ to 30.5¢

ATLAS

FOR STRIP HANDLING EQUIPMENT

• Strip steel can be handled very economically on rail cars as compared with other means of conveyance. Strip cars can be handled by heavy-duty rubber tired tractors or by locomotives running on the track rails, or they can be self-propelled motor-driven with power supplied by storage battery in the car.



125-Ton DOUBLE TRUCK CAR

for handling steel strip in rolls. This car is hauled by tractor shown below.

SPECIAL HEAVY-DUTY GAS-ELECTRIC TRACTOR

for hauling 125-Ton Strip Handling Cars. Tractors run on rubber tires.

135-Ton FLAT CAR

Powered by storage battery for handling sheet steel.

25-Ton PLATFORM CAR

Powered by storage battery, operates at slow speed and has operator's platform at each end.

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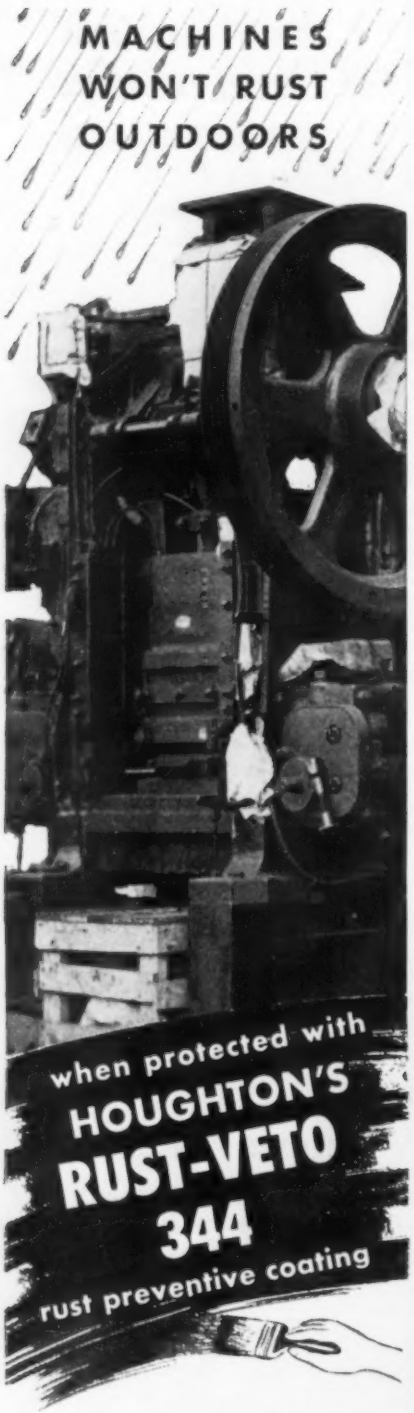

You'll store equipment or parts outdoors without a worry when they're coated with RUST-VETO 344! It withstands all kinds of weather—expands and contracts with the metal—won't come off till you want it to! This black, thin-film preventive is easily sprayed or painted on idle machines. And just as easy to remove when putting them back in service again. Economical . . . one coat lasts a year or more! Write for bulletin on industrial rust preventives for all uses. E. F. Houghton & Co., Philadelphia 33, Pa.

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Ready to give you on-the-job service . . .

ELECTRICAL SHEETS

22 Ga. H-R cut lengths

F.o.b. Mill Cents Per Lb.	Armature	Elec.	Motor	Dynamo	Transf. 72	Transf. 65	Transf. 58
Beech-Bottom-15	....	7.25	8.50	9.30	9.85	10.40	11.10
Brackenridge-28	....	7.25	8.50	9.30	9.85	....	....
Follansbee-63	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Granite City-22	....	7.95	9.20	....	....	....	....
Ind. Harbor-3	6.75	7.25	....	....	....	....	....
Mansfield-75	7.25	7.75	9.00	9.80	....	....	....
Niles, O.-64	7.00	7.55	....	....	....	....	....
Vandergrift-1	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Warren, O.-4	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Zanesville-7	6.75	7.25	8.50	9.30	9.85	10.40	11.10

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max. Si.)

0.06% C	30.50	0.20% C	29.50
0.10% C	30.00	0.50% C	29.25
0.15% C	29.75	1.00% C	29.00
2.00% C			28.75
65-69% Cr, 4-9% C			22.00
62-66% Cr, 4-6% C, 6-9% Si.			22.85

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.

0.20% Max. C.	$1.09
0.50% max. C.	1.05
.00 min. C.	1.04

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down, bulk 2-in. x down, 21.75¢ per lb of contained Cr plus 12.00¢ per lb of contained Si.

Bulk 1-in. x down, 21.90¢ per lb contained Cr plus 12.20¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, dump, delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.

Carloads	19.00
Ton lots	23.10
Less ton lots	23.90

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	20.40
Ton lots	22.30
Less ton lots	23.30

CMSZ

Contract price, cents per lb of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50.56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	20.75
Less ton lots	22.00

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	16.50¢
Less ton lots	17.75¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.00¢
Ton lots to carload packed	19.00¢
Less ton lots	20.50¢

SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.25
Less ton lots	18.50

Here a Euclid Crane "pays its own way" in this modern power house.

The continual maintenance of power equipment is a big "MUST" which is made possible to a large degree and assured in this case by a Euclid Crane.

The wise judgment of Euclid users is repeatedly confirmed by years of reliable service.

Write *today* for the Euclid Catalog.

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THE EUCLID CRANE & HOIST CO.
1361 CHARDON ROAD • EUCLID, OHIO

FERROALLOYS

Ferromanganese

78-82% Mn maximum contract base price, gross ton, lump size.
F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont., Ashtabula, O. $185
F.o.b. Johnstown, Pa. $187
F.o.b. Sheridan, Pa. $185
F.o.b. Etna, Clairton, Pa. $188
$2.00 for each 1% above 82% Mn, penalty $2.15 for each 1% below 78%.
Briquets—Cents per pound of briquet, delivered, 66% contained Mn.
Carload, bulk 10.95
Ton lots 12.55

Spiegeleisen

Contract prices gross ton, lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$74.00	$75.00
Pgh. or Chicago	74.00	75.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.
Carload, packed 29.75
Ton lots 31.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.
Carloads 28
Ton lots 30
Less ton lots 32

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb. of contained Mn .....19.15¢

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots..	2.40	3.30	4.55

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.
Carload bulk 9.90
Ton lots 11.55
Briquet, contract basis carlots, bulk delivered, per lb of briquet 11.15
Ton lots 11.75

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $92.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $83.00. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.
96% Si, 2% Fe..... 21.70
97% Si, 1% Fe..... 22.10

Silicon Briquets

Contract price, cents per pound of briquet bulk, delivered, 40% Si, 1 lb Si briquets.
Carload, bulk 6.95
Ton lots 8.55

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump, bulk, carloads, delivered.

25% Si.....	19.00	75% Si.....	14.30
50% Si.....	12.40	85% Si.....	15.55
90-95% Si			17.50

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd, Mn 85-90%.

	Carloads	Ton	Less
0.7% max. C, 0.06% P, 90% Mn.....	26.25	28.10	29.30
0.07% max. C.....	25.75	27.60	28.80
0.15% max. C.....	25.25	27.10	28.30
0.30% max. C.....	24.75	26.60	27.80
0.50% max. C.....	24.25	26.10	27.30
0.75% max. C, 7.00% max. Si.....	21.25	23.10	24.30

A-1018

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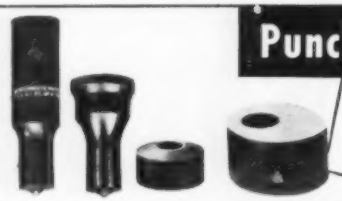

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76 styles of Punches • 65 styles of Dies

Round, square, flat, and oval sizes are standard in most of the styles.

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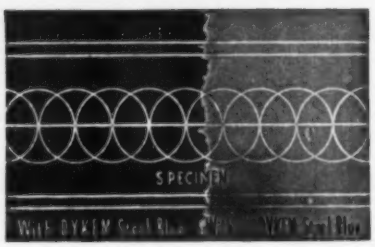

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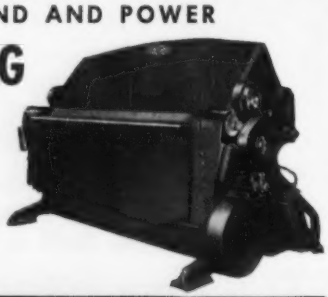

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Special Bending Brakes

Double Folder Brakes

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STEEL INGOTS APPROX. 500 TONS MONTHLY

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CHUCKING MACHINES

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CAP SCREWS

SPECIAL PARTS

SCREW MACHINE PRODUCTS

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ACCURACY IN DETAIL ★ SPEEDY SHIPMENTS

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BALDT ANCHOR, CHAIN & FORGE DIVISION

of *The Boston Metals Company* CHESTER, PA.

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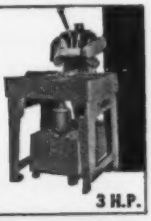

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NEWS OF USED, REBUILT AND SURPLUS MACHINERY

Await Ceiling Price—Used machinery dealers are awaiting announcement of a ceiling price schedule to halt the upward spiral of used machine tool prices. On a few items, including turret lathes in Cleveland, prices were hovering at a level 25 pct above list for a new machine.

There is a report circulating that concrete price controls on the used machinery field would be announced around Apr. 1. The delay is probably being caused by an inadequate OPS staff snowed under by work. MDNA is still awaiting approval of its Industry Advisory Committee and the okay and selection of an adviser.

Some Want Free Market—As in every field, there are some who publicize their opposition to price controls of any kind, maintaining that the best way to bring out equipment is in an unregulated market. If this thinking is applied to every industry, and many could come under this claim of freedom of market, the force of inflation would spread like chain reaction. It could sabotage our economy.

There is a time and place for everything, and the time for controls has arrived some time ago—as many dealers will testify.

Out in the Cold—Some Cleveland dealers have a reasonable gripe, one that has been heard before from other markets, that they have been nudged out of the auction picture. When they try to buy for stock or resale, plant buyers are raking off the cream at prices which the average dealer does not want to touch.

To beat the market, some dealers are taking machines out of the selling market and advertising them for rent. This trend is developing slowly because most customers want to buy. Those who don't have the cash to buy are automatically not as good a rental risk, it is indicated.

Exceeds Facilities — Cleveland rebuilders report that the volume of work available far exceeds their facilities. Washington is letting contracts for rebuilding of many machines from the Emergency Production Reserve on a firm contract basis. Rebuilders are not whooping it up to get this work because the profit picture is a little sour.

Old customers are asking rebuilders to take on some work. The shops are loaded but it is difficult to turn a customer down.

Changing Trend—Before World War II rebuilders had enough of a price margin to pick up machines and rebuild for stock and later resale. Inflated prices has changed the character of this activity. When rebuilders buy a used machine, its eventual rebuilt price is in many cases above the original list price. There is some unfounded resentment against this on the buyer's part.

Used Matches New — Some Cleveland dealers complain that some operators are listing used machine tools for sale in newspaper ads that they do not have in stock. They can work the gimmick by teaming up with some plants. Machines actually still in the plant are advertised and the agent works on a percentage basis.

Probably the hottest item in the market here is turning equipment, closely followed by turret lathes. At a recent auction a buyer paid $10,500 for a radial drill—where is and as is. Price of a new drill of the same size: $10,500. Demand has not yet reached a peak to create a substantial movement of older machines or clunkers.

MDNA Convention—MDNA will hold its 1951 annual convention at the Drake Hotel, Chicago, on May 31, June 1 and 2. Hosts will be the Chicago Chapter. Subject, says MDNA, will be "entertainment."

A CHILTON PUBLICATION

the Iron Age

E NATIONAL METALWORKING WEEKLY March 29, 1951

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- Reelers
- Sizing Mills
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- ntinuous Seamless Tube Rolling Mills
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- Bar Turning Pointers
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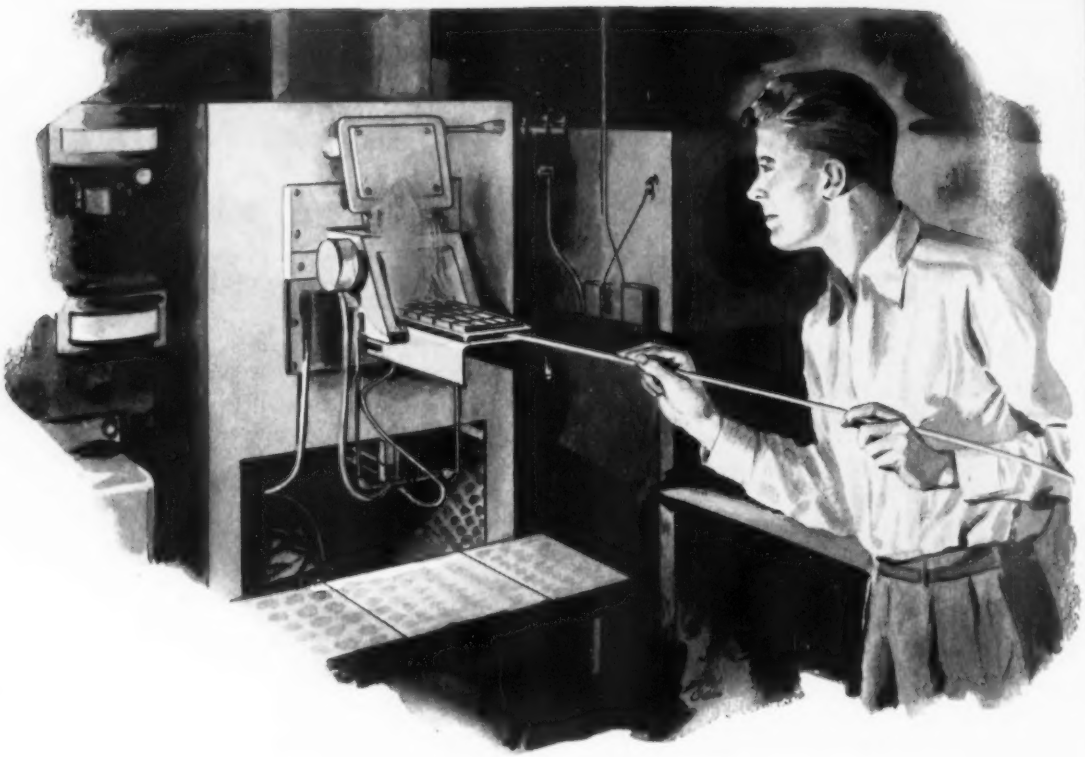

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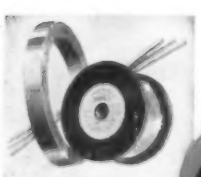

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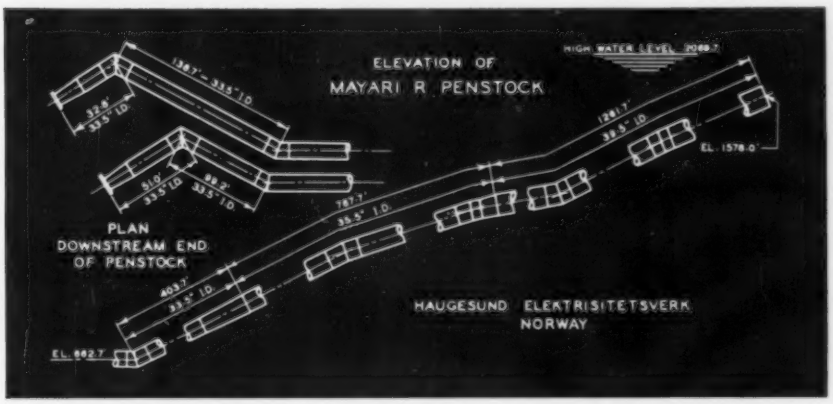

Approximately 500 tons of Mayari R plate was fabricated into penstock sections 30 ft in length for Haugesund Elektrisitetsverk. Each penstock is more than 2600 ft in length. Static head of water is 1407 ft; surge is 352 ft; design stress is 23,300 psi.

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DIGEST

MARCH TWENTY-NINTH • NINETEEN FIFTY-ONE • VOLUME 167 • NUMBER 13

PAGE 15 **STEEL FOR DEFENSE — LULL BEFORE STORM**
Defense and essential users will soon be taking more than half of all steel produced in this country. This is proven by orders now on the books. One of the nation's largest steel companies already has more than half its output scheduled for these users. Other mills aren't far behind.

PAGE 79 **FLOW OF CONTRACTS TO WEST COAST LAGS**
Impact of defense orders on West Coast steel mills is not as heavy as in the East and Midwest. So far only two important prime contracts—for military type vehicles—have been awarded. It will be 6 months before these are in production, and even then requirements will probably be light.

PAGE 81 **COOLER HEADS RULE TAX WRITE-OFFS**
Now that the cooler heads of NPA's commodity divisions will scrutinize applications for fast tax write-offs, source of supply for steel will be weighed against future expansion. The Steel Div. is already casting a suspicious eye on some steel plans—but a few worthy projects may be slowed.

PAGE 83 **NEW INGOT MOLD COATINGS ARE NOW IN USE**
Union opposition to tar mold coating fumes has forced investigation of substitutes. Four have been thoroughly tested. Two have not been satisfactory, but Darmold AE has been tentatively adopted at Gary Steel Works. Mold temperature must be maintained within an unusually narrow range.

PAGE 86 **WELDED SPHERES SOLVE NITROGEN STORAGE**
Tanks to store liquid nitrogen used for rocket propellants must meet 15 ft-lb Charpy impact test at —300°F. The development of special designs and changes in welding practice have made possible the production of new spherical tanks that hold 200 gal, capable of 5500 psi service.

PAGE 90 **FIGHTER WING REDESIGNED FOR MAGNESIUM**
Experimental wings of thick magnesium sheet have been made by East Coast Aeronautics and successfully adapted to the Lockheed F80C. The new design eliminates countless stiffeners, saves manufacturing time and because of its lower weight also makes it possible to carry 30 pct more fuel.

PAGE 105 **EXPANDING STEEL OUTPACES SCRAP SUPPLY**
Stocks of scrap iron and steel have been scythed down by this year's "sudden" shortage that may reap a toll of idle openhearths later. Scrap price rollbacks have been tagged the scapegoat but the market's afflictions are more chronic. Some see much greater reliance on hot metal charges.

PAGE 107 **FIRST VENEZUELAN ORE SHIP COMES IN**
On the dock at Sparrows Point, Md., last week were officials of Bethlehem Steel and the Venezuelan embassy but the star of the show was the red ore aboard the S. S. *Bethore*. The first shipment from the Venezuelan mines totalled 23,850 tons. Present mine production is about 2000 tons a day.

PAGE 108 **DO'S—MERCHANT IRON STUMBLING BLOCK**
Consumers, producers of merchant iron are getting a double-barrelled attack from the increasing shortage and the pitfalls of the DO system. With foundries competing for every ton of iron, foreign shipments were moving as far West as Chicago. Producers saw a serious shortage forming.

PAGE 110 **HARDWARE, APPLIANCE INVENTORIES BULGE**
Appliance and hardware manufacturers are feeling cuts on materials but wholesalers and dealers are bulging with inventory. The weight of metal restrictions is not expected to bear heavily on the retail level for another 6 months. Overall output in 1951 is expected to remain high.

PAGE 111 **CONTACT: FOR PRIME AND SUBCONTRACTORS**
Quick contact between prime and subcontractors is the aim of "Can You Make It?" a new weekly feature of THE IRON AGE, p. 111. It will help prime contractors find capable manufacturers to produce vitally needed parts, and will give small business a chance to obtain vital defense work.

NEXT WEEK **TEN ZIRCONIUM ALLOYS EVALUATED—PART I**
This is the first publication of properties of zirconium alloys. Hafnium up to 8.2 pct did not affect tensile properties. Aluminum, titanium, tantalum, columbium, oxygen, nitrogen increased strength. The zirconium alloys are not as resistant to oxidation as commercially pure metal.

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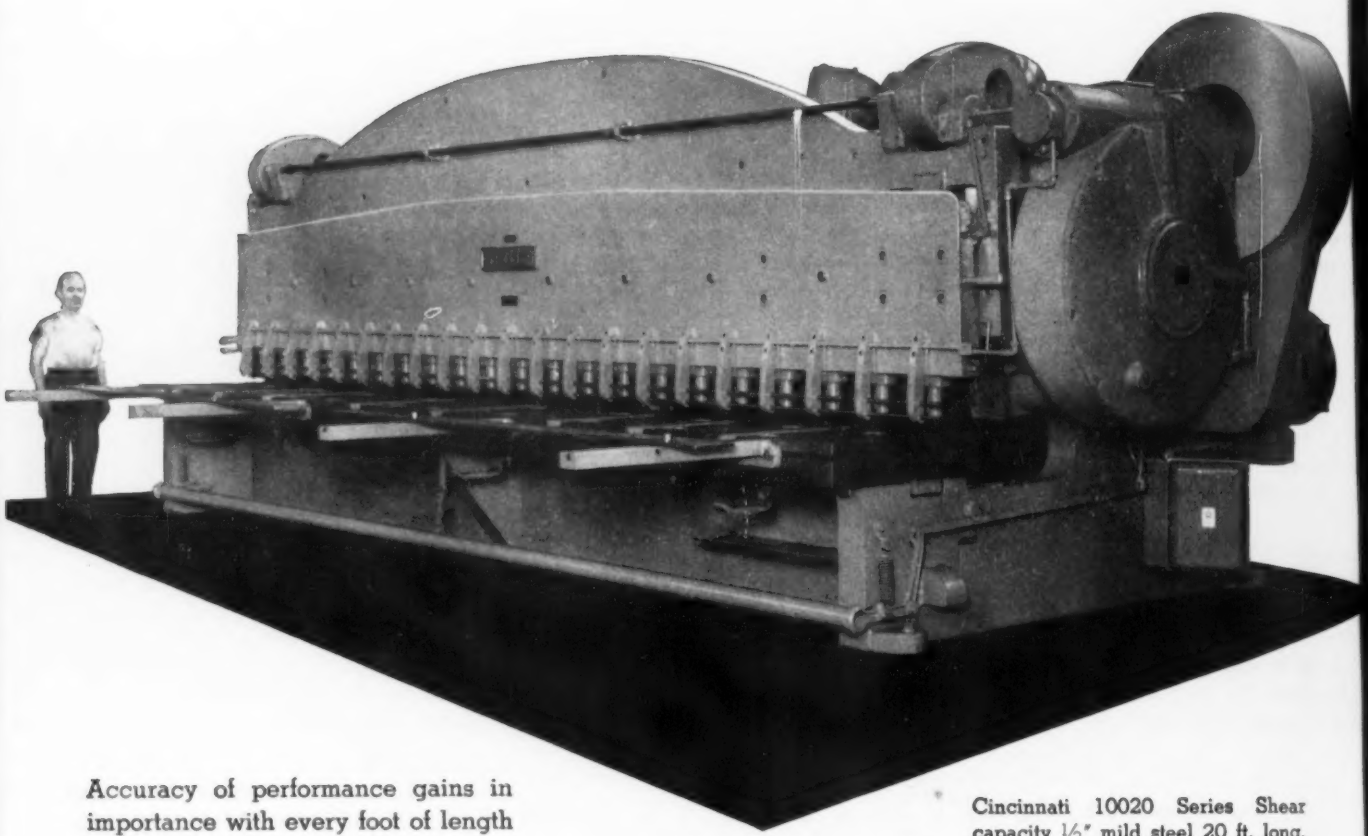

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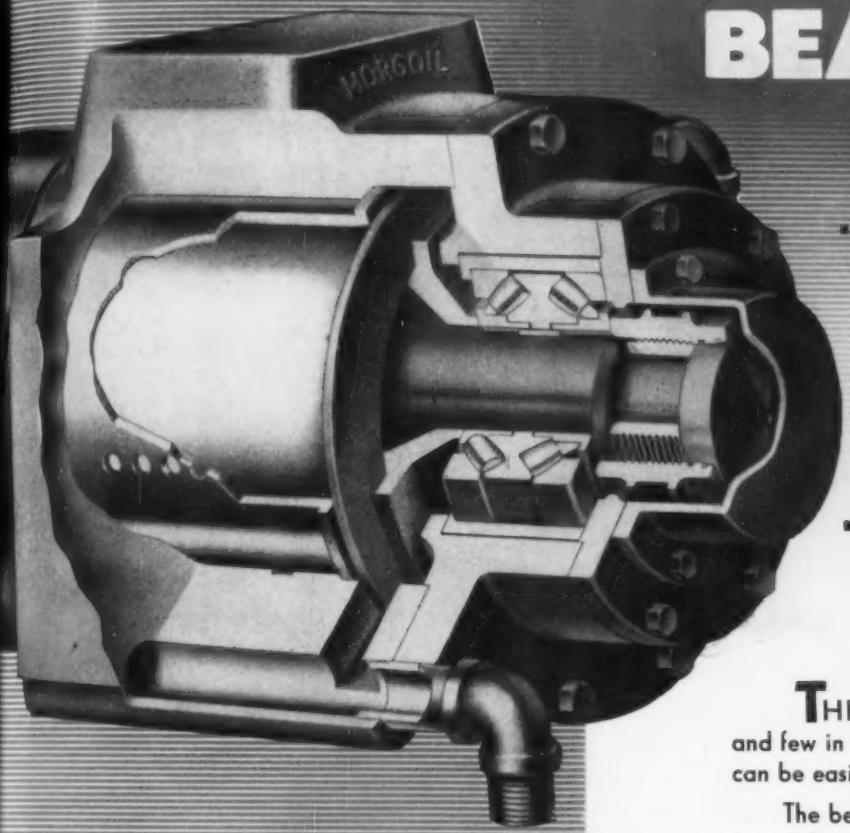

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Yes, now you can finish large quantities of intricate metal parts to exact dimensions and exact degrees of surface finish — and prepare them for plating — all in one fast economical operation.

Plants everywhere are saving money by eliminating many slow, expensive hand-finishing operations and switching to barrel finishing with Norton ALUNDUM Tumbling Abrasive as the finishing medium.

For full details, contact your Norton abrasive engineer or distributor, or write direct to the Sales Engineering Department.

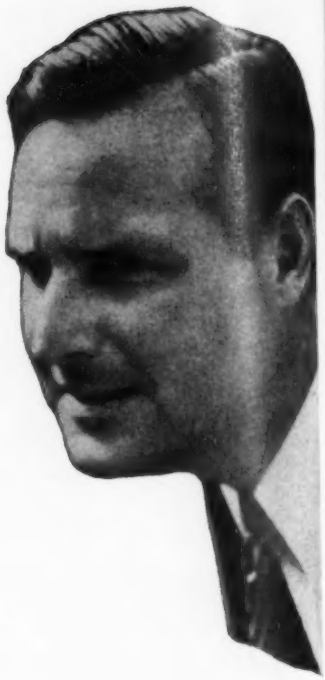
NORTON COMPANY • Worcester 6, Mass.

Distributors In All Principal Cities

NORTON ABRASIVES

Making better products to make other products better

G-224



"I WISH THERE WAS A GOOD SUBSTITUTE FOR THE TYPE OF STEEL I'M LOOKING FOR."

"CALL U. S. STEEL SUPPLY. IF THERE IS, THEY'LL KNOW ABOUT IT."

...your best source of supply...

UNITED STATES STEEL SUPPLY COMPANY

Warehouses and Sales Offices: BALTIMORE • BOSTON • CHICAGO • CLEVELAND • LOS ANGELES • MILWAUKEE • MOLINE, ILL. NEWARK • PITTSBURGH • PORTLAND, ORE • SAN FRANCISCO • SEATTLE • ST. LOUIS • TWIN CITY (ST. PAUL)
Sales Offices: INDIANAPOLIS • KANSAS CITY, MO. • PHILADELPHIA • ROCKFORD, ILL. • TOLEDO • TULSA • YOUNGSTOWN

Headquarters Offices: 208 S. La Salle St.—Chicago 4, Ill.

UNITED STATES STEEL

cut threads

BETTER FASTER CHEAPER

1. LANDIS DIE HEADS cut tool cost by using chasers that are independent units. Worn or damaged chasers are reground or replaced *individually,* without affecting the remaining chasers of the set.

2. LANDIS DIE HEADS reduce tool inventories by cutting *both* right- and left-hand threads with a *single* set of chasers. Chasers are ground on both ends, the spring action in the die head is reversed, and either a right-hand or left-hand set of chaser holders is used.

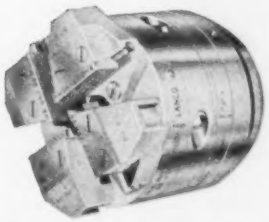
3. LANDIS DIE HEADS cut all diameter threads with a constant pitch and form within the rated range of the die head with a *single* set of chasers. Short thread lengths larger than the rated diametrical range can be cut with the *same* die head equipped with over-size chaser holders.

4. LANDIS DIE HEADS use chasers that can be reground for most of their original length. Regrinding is a simple operation restoring the entire cutting edge and leading feature, yet retaining the initial accuracy of pitch, diameter, and depth of cut.

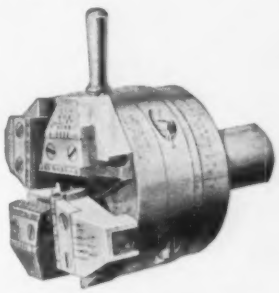
5. LANDIS DIE HEADS improve thread finish and cut production costs by reducing chaser wear and breakage. The tangential position of the chaser to the work allows lateral absorption of cutting strains. Resulting reduced friction and vibration make higher cutting speeds possible without causing thread distortion or chaser breakage.

6. LANDIS DIE HEADS consistently produce threads accurate for lead. Regrinding does not destroy the lead controlling feature of the chasers. Thus this feature assures accurate pitch threads throughout the chaser's life.

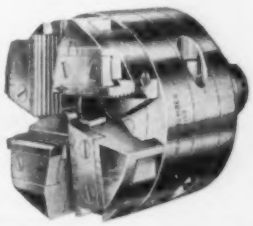
7. LANDIS DIE HEADS are built to stay on the production line. Tough, high-carbon steel is used in all parts. Rigid construction maintains accuracy, and minimizes wear of working parts. Landis Die Heads are furnished in two models, heat-treated or hardened-and-ground, depending on the application and quality of thread desired.



LANCO—a revolving die head for hand-operated, semi-automatic, and automatic threading machines.



LANDMATIC—a stationary die head with self-opening action for turret lathes.



LANDEX—a revolving die head for automatic screw machines and other "live spindle" machines.

LANDIS *Machine* COMPANY

WAYNESBORO • PENNA.

ROUND AND SHAPED TUBING

(.010" to ⅝" O.D. Max. Certain Analyses .035" max. wall to 1⅜" O.D.) Available in:

Carbon Steels:
A.I.S.I.—C-1008, MT-1010, MT-1015, C-1118, MT-1020, C-1025, C-1035, E-1095

Alloy Steels:
A.I.S.I.—4130, 4132, 4140, 4150, 8630, E-52100

Stainless Steels:
A.I.S.I.—303, 304, 305, 309, 310, 316, 317, 321, 347, 403, 410, 420, 430, 446, T-5

Nickel Alloys:
Nickel, "D Nickel"*, "L Nickel"*, "Monel"*, "K Monel"*, "Inconel"*, 30% Cupro Nickel, 18% Nickel Silver.

Beryllium Copper.

*Reg. U.S. Trademark International Nickel Company

The HOLE Story —by— Superior

Chapter 2

The Bubble That Beats Trouble to the Punch

In science, the arts and industry, fine small tubing serves many purposes, from the hypodermic injection of healing drugs to the control of hydraulic presses that produce airplane and tank components.

In every tubing job there is one prime requirement. The tube must not leak. Here at Superior we specialize in the production of high quality tubing in all practical metals . . . and we use many methods to insure the superiority of our product.

Precision gauges in the hands of experienced inspectors check for dimensional precision. High powered microscopes in our laboratories investigate grain structure. Chemical analysis maintains close control on metallurgy. And in our shops compressed air, under pressures to hundreds of pounds per square inch, is forced into tubing held under water to make sure that leaks are detected and eliminated.

The whole story of Superior is one of quality . . . in machines and methods, in men, and in the end result —fine small tubing to do tough jobs well.

This is a story with continuity, for our aim holds always to raise the standards by which we judge Superior tubing . . . and to continue to increase the rate at which we produce it to meet your demands.

SUPERIOR TUBE COMPANY, 2004 Germantown Ave., Norristown, Pa.

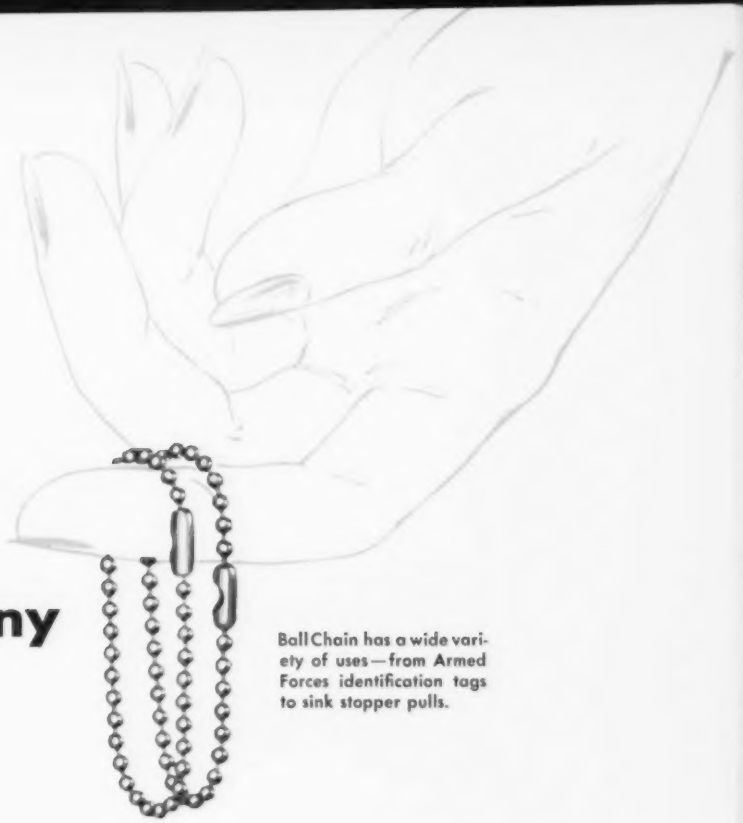
West Coast: Pacific Tube Company, 5710 Smithway St., Los Angeles 22, Calif. UNderhill 0-1331.

Superior
THE BIG NAME IN SMALL TUBING

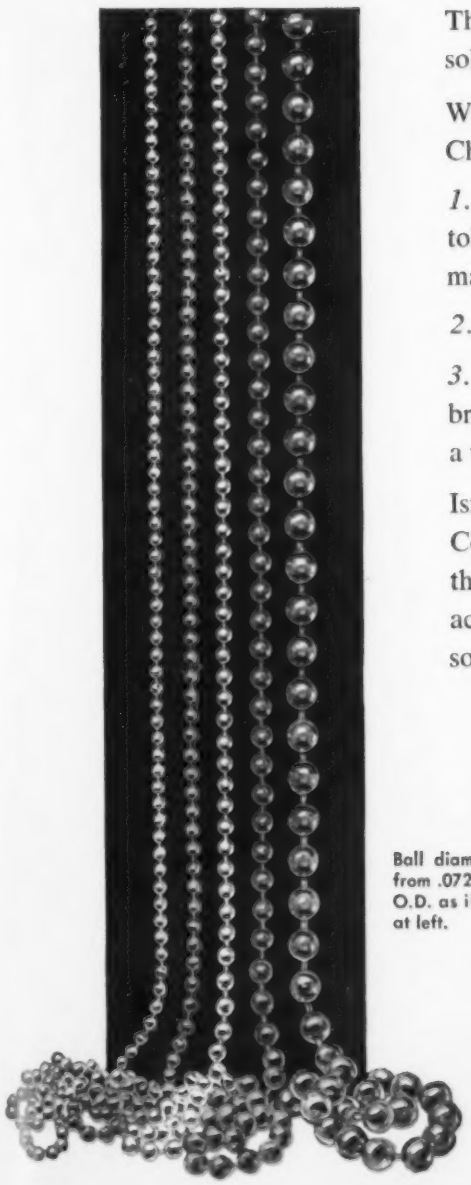
All analyses .010" to ⅝" O.D.
Certain analyses (.035" max. wall)
Up to 1⅜" O.D.

FOR SALE

. . . two for a penny



Ball Chain has a wide variety of uses—from Armed Forces identification tags to sink stopper pulls.



Ball diameters vary from .072" to .187" O.D. as illustrated at left.

That, roughly, is the manufacturer's price in quantity for these solid brass key chains.

What makes it possible? These three factors, as outlined by the Ball Chain Manufacturing Co., Inc., of Mount Vernon, New York:

1. Ingenuity in the design of multiple dies of extremely close tolerances . . . and their adaptation to specially developed automatic equipment.

2. High production over long periods.

3. Uncompromising standards of quality in every mill shipment of brass, copper or nickel silver strip necessary for the fabrication of a wide variety of Ball Chains and attachments.

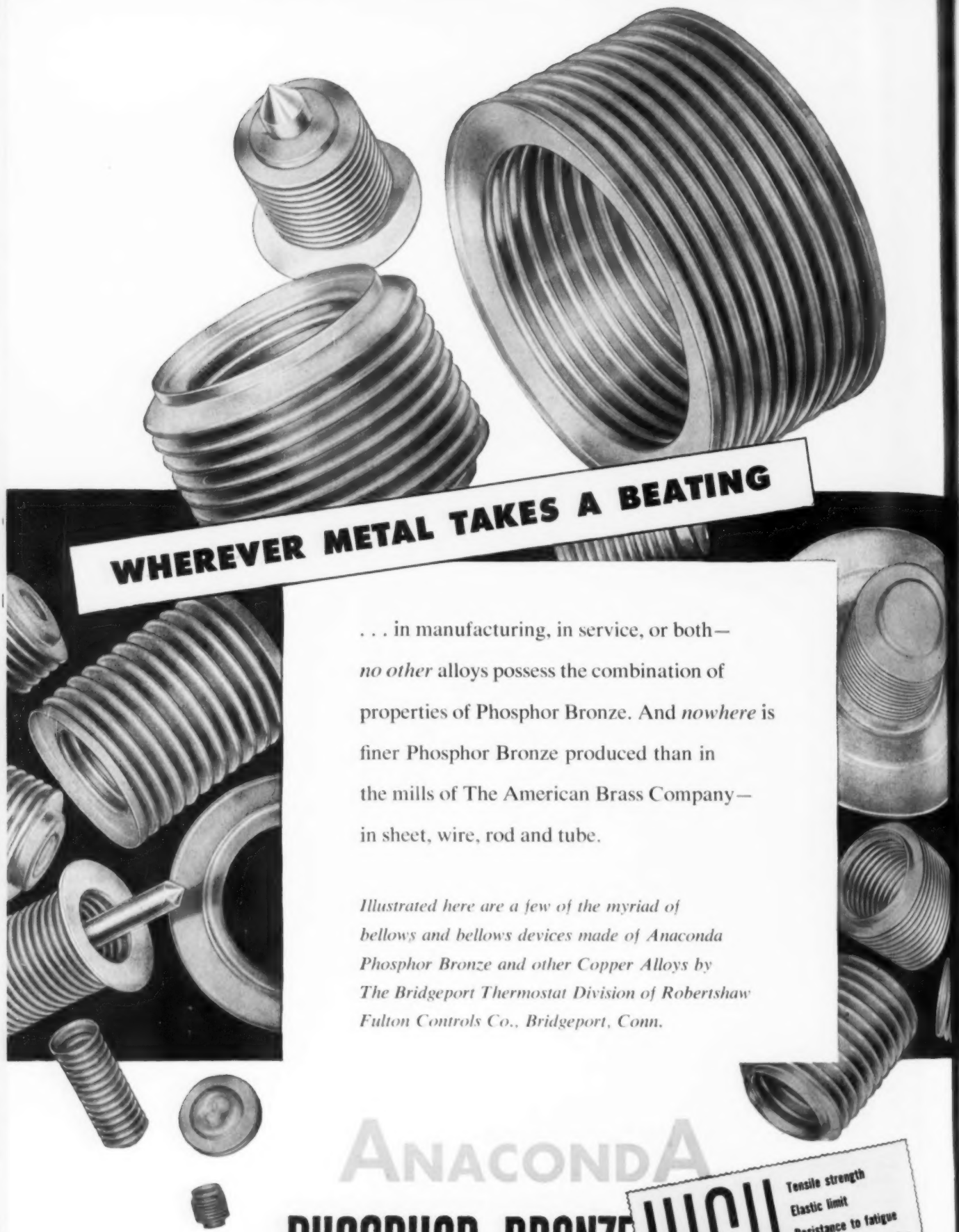
Isn't it significant that "Ball Chain" considers The American Brass Company its most dependable source of supply for metals made to the most exacting requirements; composition, anneal, flatness across the entire strip width, and uniform gage of metal which, in some instances, must be within .00025".

81101

ANACONDA

the name to remember in

COPPER · BRASS · BRONZE



WHEREVER METAL TAKES A BEATING

. . . in manufacturing, in service, or both—
no other alloys possess the combination of
properties of Phosphor Bronze. And *nowhere* is
finer Phosphor Bronze produced than in
the mills of The American Brass Company—
in sheet, wire, rod and tube.

Illustrated here are a few of the myriad of bellows and bellows devices made of Anaconda Phosphor Bronze and other Copper Alloys by The Bridgeport Thermostat Division of Robertshaw Fulton Controls Co., Bridgeport, Conn.

ANACONDA

PHOSPHOR BRONZE HIGH

Tensile strength
Elastic limit
Resistance to fatigue
Resistance to corrosion
Resistance to wear

"BEST BY ANY TURNING TEST"
in the toolroom and on the production line.
Write to Dept. 710 for complete information
and performance data.

Jones & Lamson turret lathes are BUILT and

POWERED TO PRODUCE

MORE CHIPS per tool
MORE PIECES per hour
MORE PROFIT per job . . . than any turret lathe of comparable size!

Turret Lathe Division

JONES & LAMSON
MACHINE COMPANY
Springfield, Vermont, U.S.A.

MACHINE TOOL CRAFTSMEN SINCE 1835

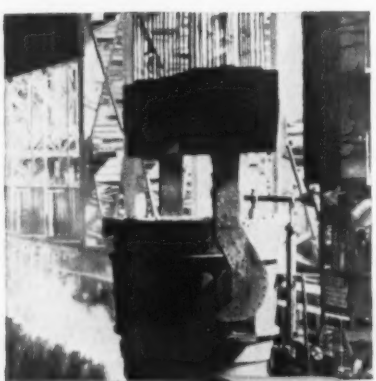
Greatest steel tonnage
Helped by HYATTS

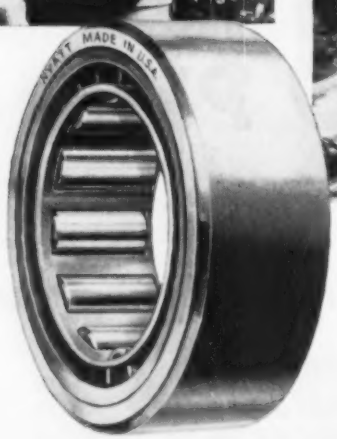
Recently the steel industry set a new production record of 2,000,000 tons in one week—and it is aiming still higher.

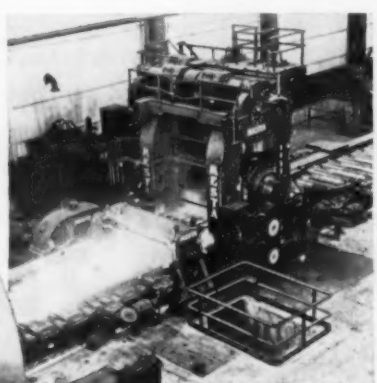
To attain and maintain such a high production level operating equipment must necessarily be at peak performance at all times.

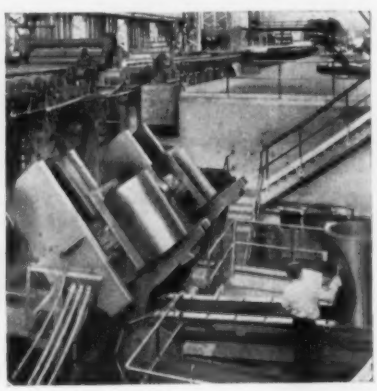
And to help keep the mills operating successfully at this continuous pace Hyatt Roller Bearings are serving and saving in tables...cars...cranes...mill motors...and other auxiliary equipment.

Thus proved by performance, easing shock loads, extending equipment life and reducing operating costs, Hyatts are the preferred steel mill bearings for new equipment or changeovers. Hyatt Bearings Division, General Motors Corporation, Harrison, N. J.; Chicago, Ill.; Pittsburgh, Pa.; Oakland, Calif.

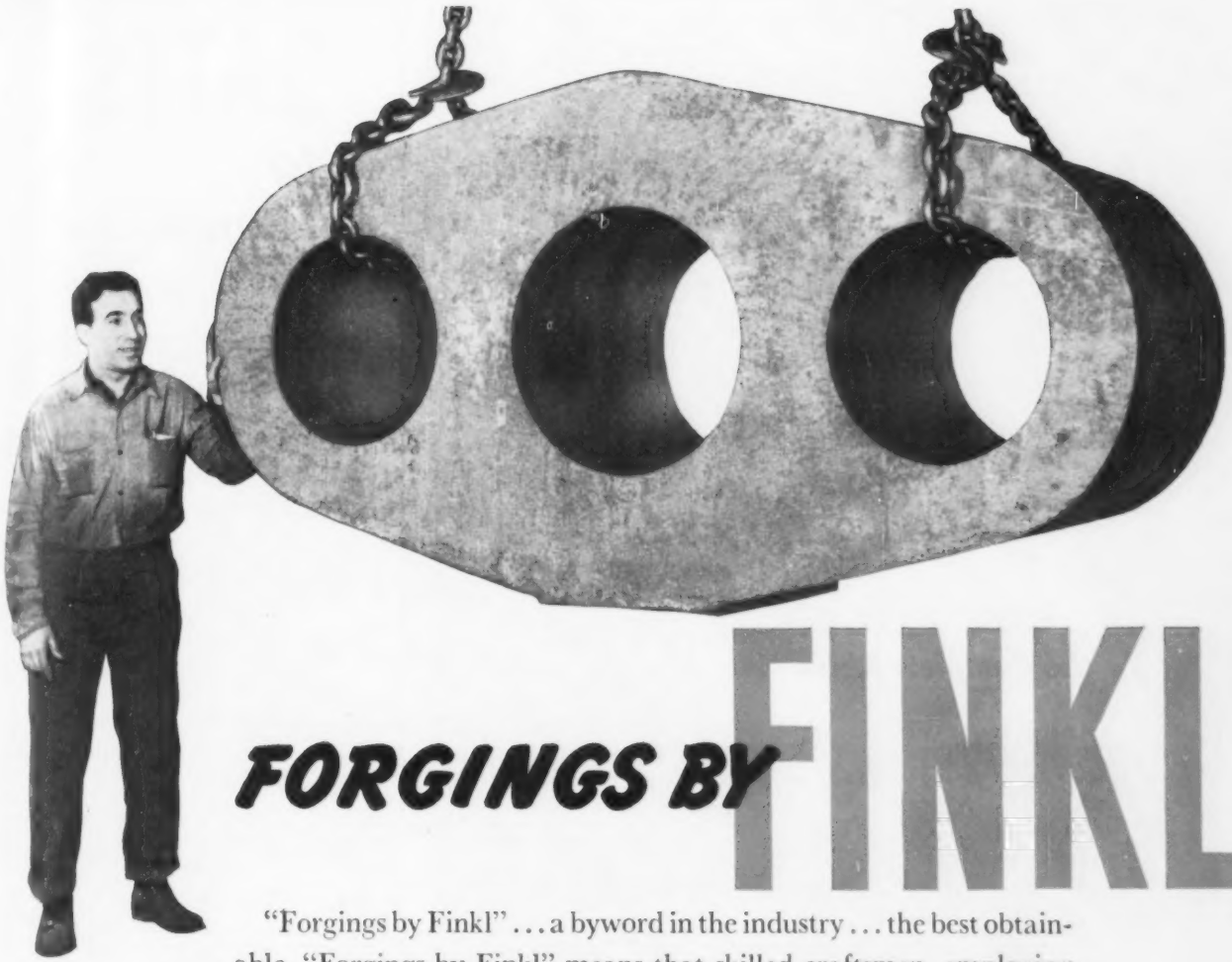








HYATT ROLLER BEARINGS



FORGINGS BY FINKL

"Forgings by Finkl" . . . a byword in the industry . . . the best obtainable. "Forgings by Finkl" means that skilled craftsmen, employing modern methods and machinery, have selected the best steel for the job and created the best job from the steel. And to doubly insure long life and economical performance, each step in the development of the forging is thoroughly checked metallurgically. Nothing is taken for granted.

A medium size forging, illustrated above, is the top head for a 2,000 ton hydraulic press. It is made of C-1045 steel, normalized and drawn in one of Finkl's heat treating shops. Forged from a 59″ ingot, the rough machined forging shown weighs 22,800 pounds. Whether carbon or alloy steel, the Finkl organization can easily handle any job from a few pounds up to 50,000 pounds apiece.

Write or phone when you are ready to talk about or plan your forgings. The experience of Finkl Sales Engineers is available to you.

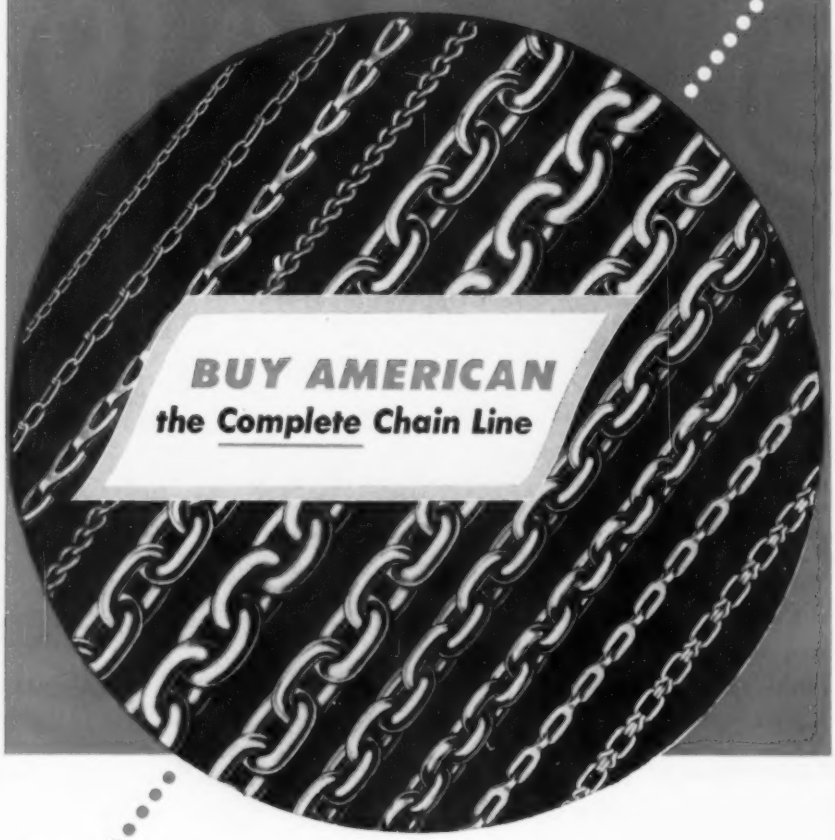
MANUFACTURERS OF THE LARGEST FORGINGS IN THE MIDDLE WEST

A. Finkl & Sons Co.

2011 SOUTHPORT AVENUE • CHICAGO 14

DIE BLOCKS & INSERTS • PISTON RODS & RAMS • SOW BLOCKS • CRANKSHAFTS

for Your Own Use... for the Products You Make...



11 popular AMERICAN chains are illustrated. There are many more . . . welded . . . weldless . . . and attachments. Sizes and types . . . from tiny jack chains . . . to huge stud link anchor chains.

AMERICAN makes the chain you need . . . in the material best suited to the job. Your local **AMERICAN CHAIN** distributor stocks fast-moving types . . . will get others for you. See him today.

Buy AMERICAN
. . . the complete chain line

"Intentionally Better" AMERICAN CHAIN

York, Pa., Atlanta, Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Bridgeport, Conn.

ACCO

AMERICAN CHAIN DIVISION
AMERICAN CHAIN & CABLE

TRADE MARK

In Business for Your Safety

DATES *to remember*

Apr. 2-3—Diamond Core Drill Manufacturers Assn., annual meeting. The Homestead Hot Springs, Va. Association headquarters are at 122 E. 42nd St., New York.

Apr. 2-4—American Institute of Mining & Metallurgical Engineers, openhearth and blast furnace, coke oven and raw materials conference. Statler Hotel, Cleveland. Institute headquarters are at 29 W. 39th St., New York.

Apr. 2-4—American Gas Assn., national sales conference. The Shoreham Hotel, Washington. Association headquarters are at 420 Lexington Ave., New York.

Apr. 2-5—American Society of Mechanical Engineers, spring meeting, Atlanta Biltmore Hotel, Atlanta. Society headquarters are at 29 W. 39th St., New York.

Apr. 2-7—Steel shipping Container Institute, annual meeting, Palm Beach-Biltmore Hotel, Palm Beach, Fla. Institute headquarters are at 570 Lexington Ave., New York.

Apr. 4-6 — Midwest power conference, Sherman hotel, Chicago. Conference director Dr. R. A. Budenholzer, Illinois Institute of Technology.

Apr. 5-6—Compressed Air & Gas Institute, quarterly meeting, The Homestead, Hot Springs, Va. Institute headquarters are at 122 E. 42nd St., New York.

Apr. 8-11—Electrochemical Society, spring meeting, Wardman Park Hotel, Washington. Society headquarters are at 235 W. 102nd St., New York.

Apr. 8-12—American Hardware Manufacturers Assn., annual convention, Palm Beach, Fla. Association headquarters are at 342 Madison Ave., New York.

Apr. 9-10—American Institute of Steel Construction, spring engineering conference, Hotel William Penn, Pittsburgh. Institute headquarters are at 101 Park Ave., New York.

Apr. 15-18—Scientific Apparatus Makers Assn., annual meeting, Greenbrier, White Sulphur Springs, W. Va. Association headquarters are at 20 N. Wacker Drive, Chicago.

Apr. 16-18—American Gas Assn., distribution, motor vehicle and corrosion conference, Hotel Peabody, Memphis, Tenn. Association headquarters are at 420 Lexington Ave., New York.

Apr. 16-18—American Society of Lubrication Engineers, annual convention and lubrication show, Bellevue-Stratford Hotel, Philadelphia. Society headquarters are at 343 S. Dearborn St., Chicago

Apr. 16-18—Gas Appliance Manufacturers Assn., annual meeting, Drake Hotel, Chicago. Association headquarters are at 60 E. 42nd St., New York.

Apr. 16-18—Society of Automotive Engineers, aeronautic meeting and aircraft engineering display, Hotel Statler, New York. Society headquarters are at 29 W. 39th St., New York.

Apr. 18-21—Concrete Reinforcing Steel Institute, annual meeting, The Homestead, Hot springs, Va. Institute headquarters are at 38 S. Dearborn St., Chicago.

Tubing tips from the horse's mouth

Bundyweld Tubing, double-walled from a single strip. Exclusive, patented beveled edge affords smoother joint, absence of bead, less chance for any leakage.

Nagged by tubing problems?

Better get in touch with Bundy . . . headquarters for small-diameter tubing.

Bundyweld, the double-walled type of Bundy® tubing will get you in the clear with an array of features that can't be equalled by any other tubing. For only Bundyweld is double-walled from a single strip.

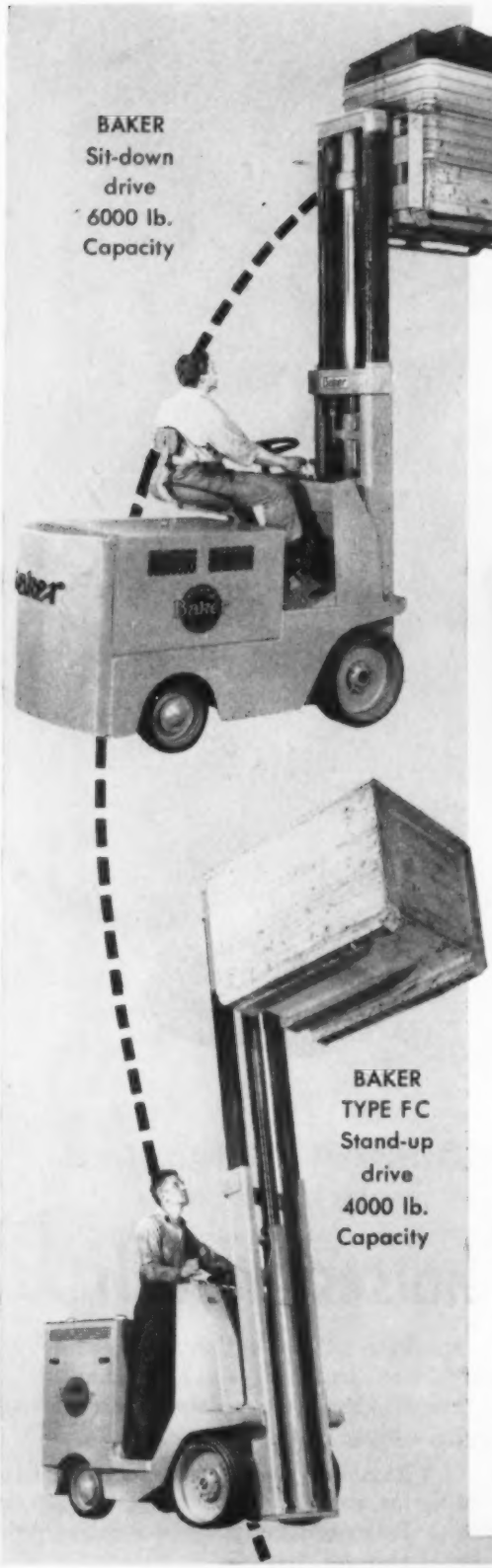
Regardless how unusual your requirements for small-diameter tubing, chances are Bundyweld can point up a money-saving plus for you . . . production-wise, or product-wise. Or both.

Bundy Tubing Company

DETROIT 14, MICHIGAN

World's largest producer of small-diameter tubing

AFFILIATED PLANTS IN ENGLAND, FRANCE AND GERMANY



BAKER
Sit-down
drive
6000 lb.
Capacity

BAKER
TYPE FC
Stand-up
drive
4000 lb.
Capacity

The remarkable BAKER newly designed 100% FUNCTIONAL FORK TRUCK is now available for

- SIT-DOWN DRIVE!
- STAND-UP DRIVE!
- CAPACITIES OF 3000 TO 6000 POUNDS!

A year ago we introduced the new BAKER Type FT Fork Truck in 3000 and 4000 pound capacities. Because of its highly advanced, completely functional design, this truck more than lived up to our claim that it would do *more work per dollar invested than any other truck in its class.*

The unprecedented acceptance of this truck and the insistent demand from our customers for other types and sizes, have resulted in our expansion of the line to include *capacities up to 6000 pounds* in both *stand-up* and *sit-down-drive.*

These new models incorporate all the features of the original 100% "Functional" FT Truck:

- ***Dynamic-braking, 5-speed, drum-type NoPlug controller.***
- ***Baker-built motors,* developing the highest horsepower for any motors their size and weight.**
- ***Exclusive Baker worm-drive transmission.***
- ***Soft-touch, direct action brakes* with dead-man control.**
- ***Baker patented wide-angle steering axle.***
- ***Rugged all-welded steel plate truck frame* with integral bumper counterweight.**

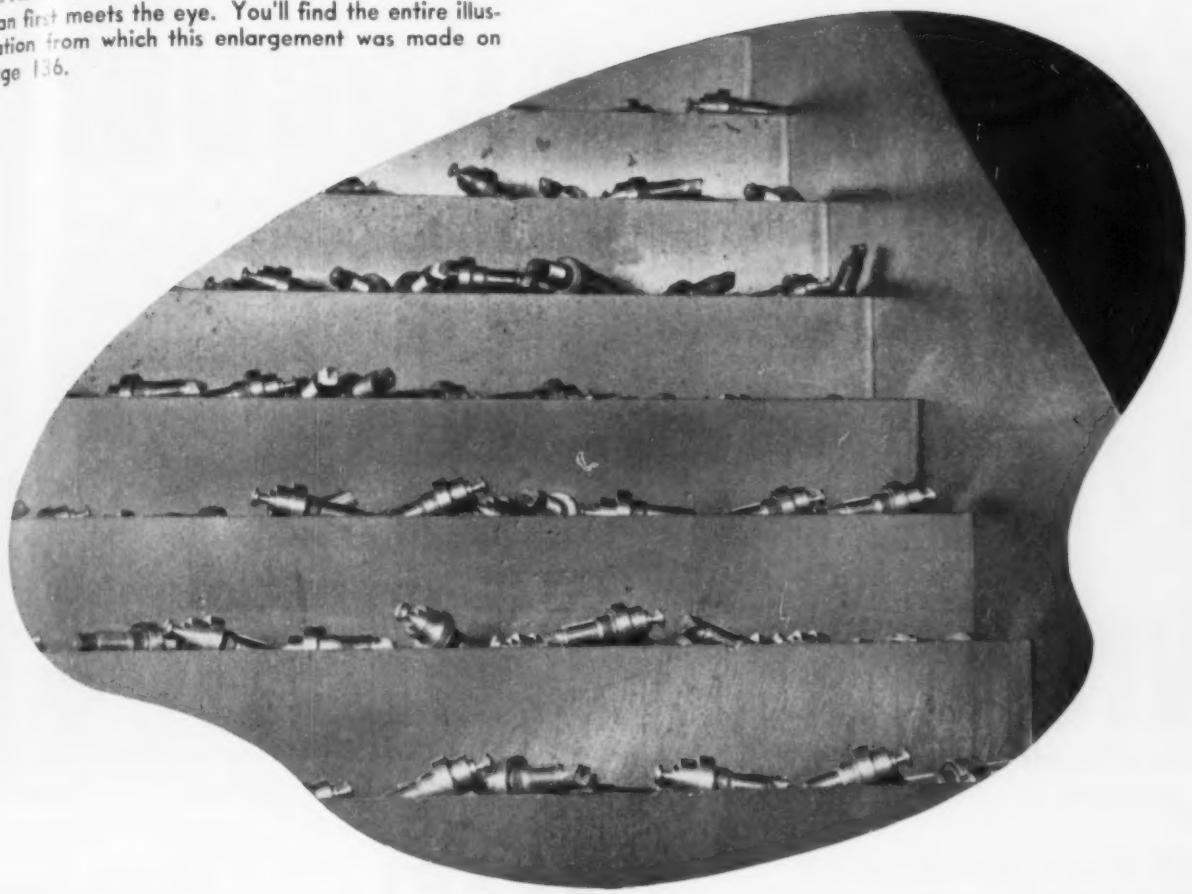
—to mention only a few.

Completely descriptive bulletins available. Ask for:
Bulletin 1324 for the FT (sit-down drive) 3000 to 4000 pounds.
Bulletin 1325 for the FT (sit-down drive) 6000 pounds.
Bulletin 1326 for the FC (stand-up drive) 3000 to 6000 pounds.

BAKER INDUSTRIAL TRUCK DIVISION *of The Baker Raulang Company*
1227 WEST 80th STREET, CLEVELAND 2, OHIO • *In Canada: Railway & Power Engineering Corporation, Ltd.*

Baker® INDUSTRIAL TRUCKS

THERE'S MORE TO THIS PICTURE
than first meets the eye. You'll find the entire illustration from which this enlargement was made on Page 136.



"Close-ups"

. . . show you what goes on at Allied. Plant photographs, illustrating a wealth of modern equipment in four large factories, could only tell a small part of the story. You have to get *close* to many individual operations—in production, engineering or even clerical departments—to see the true picture of Allied's careful attention to even relatively unimportant details . . . all of which add up to good products and good service.

At Allied every phase of every job is *important.*

ALLIED PRODUCTS CORPORATION
DEPARTMENT C-57
12617 BURT ROAD • DETROIT 23, MICHIGAN

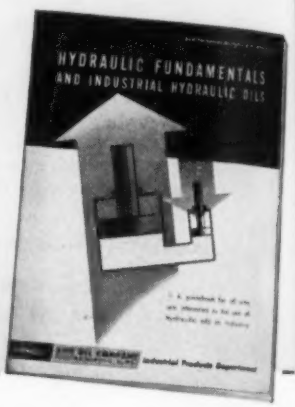
HARDENED AND PRECISION GROUND PARTS • STANDARD CAP SCREWS • SPECIAL COLD FORGED PARTS • SHEET METAL DIES FROM THE LARGEST TO THE SMALLEST • ALLITE ZINC ALLOY DIES • JIGS • FIXTURES • R-B INTERCHANGEABLE PUNCHES AND DIES

NEW SUN PRODUCT CLEANS HYDRAULIC SYSTEMS Without Downtime!

SUN'S NEW HYDRAULIC SYSTEM CLEANER eliminates the production loss and man-hour loss that usually go with the cleaning of equipment. This product does its work *without interrupting production*. It has the detergency to remove the sludges and gums formed by oxidation of hydraulic oil, soaps formed from coolants and cutting oils, and other contaminants. Besides permitting operations to go on undisturbed, it protects the system against further rusting once parts have been cleaned. Sun Hydraulic System Cleaner has been thoroughly "Job Proved" in cleaning up hydraulic systems of presses, machine tools, and circulating systems of a great variety of industrial equipment. It is available in viscosities suitable for any pump. Get peak performance out of *your* equipment by using Sun Hydraulic System Cleaner.

FREE!

to anyone who uses or maintains hydraulic equipment: this booklet by Sun Engineers on the fundamentals of hydraulic systems and the application of hydraulic oils. It will prove valuable as a guidebook in day-to-day work, a refresher course for engineers, or a readable instruction book for nonprofessionals.



Sun Oil Company
Dept. IA-3
Philadelphia 3, Pa.

☐ I should like a copy of **"Hydraulic Fundamentals and Industrial Hydraulic Oils."**

☐ I want more information about **Sun Hydraulic System Cleaner.**

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Title_____

Company_____

Street_____

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SUN INDUSTRIAL PRODUCTS

SUN OIL COMPANY, PHILADELPHIA 3, PA. • SUN OIL COMPANY, LTD., TORONTO AND MONTREAL

SUNOCO®

In *one* trimming operation, the American Stove Company,* St. Louis, cuts 96 front frames and 96 oven back frames per hour . . . a total of *192* frames per hour!

It's all done with a Whiting Quickwork Stamping Trimmer, an inexpensive, easy-to-operate machine that expedites the finishing of almost every type of sheet metal stamping. In addition to trimming, the Whiting Trimmer can also bead or form in the same or separate passes. It efficiently handles the most intricate shapes . . . large and small . . . and often trims stampings at rates up to 500 per hour. It eliminates the need for expensive trimming dies and saves valuable press time.

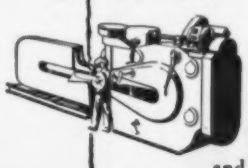
Let a Whiting engineer analyze your stampings and show you the cost reductions that can be made with this Trimmer. Send the coupon below for the Whiting Stamping Trimmer Catalog.

**Manufacturers of "Magic Chef" Ranges*

WHITING *Quickwork*

stamping trimmer

WHITING QUICKWORK ROTARY SHEARS



...another way to cut production costs!

Cut metal sheets quickly and accurately with a Whiting Rotary Shear. Cut straight lines, circles and odd shapes; slit narrow strips; bevel; form flanges; and joggle. The Whiting does *all* these jobs—one machine with attachments. Send coupon for complete information!

WHITING CORPORATION, 15601 Lathrop Ave. Harvey, Illinois

Send ☐ Whiting Stamping Trimmer Catalog
☐ Whiting Rotary Shears Catalog
☐ Name of Local Distributor

FIRM NAME

ATTENTION TITLE

ADDRESS

CITY ZONE STATE

Tool up Quick ...Cut Faster

with

CARMET CARBIDE METAL

STANDARD TOOLS AND BLANKS

SEND NOW

for CARMET CATALOG C-2

. . . also for price list . . . great helps when you need tools fast.

This 28 page booklet shows the complete Allegheny Ludlum line of CARMET standard cutting tool blanks and cutting tools, with specifications. *Write today!*

ADDRESS DEPT. IA-15

Need cutting tools in a hurry? Just name the standard styles and carbide grades desired . . . get prompt shipment from a big stock *near* you.

Our line of carbide "standards" is complete. It covers 90% of all single-point operations. CARMET standard tools come ready to use . . . easy to modify for special purposes, by grinding. Style C, illustrated, is designed particularly for conversion into various shapes for numerous applications.

Other standard CARMET styles also are immediately available from local stocks.

Order CARMET tools and blanks for better, faster, cheaper cutting. There is a grade to take care of every need.

• *Allegheny Ludlum Steel Corporation, Carbide Alloys Division, Detroit 20, Michigan.*

For complete **MODERN** Tooling, call

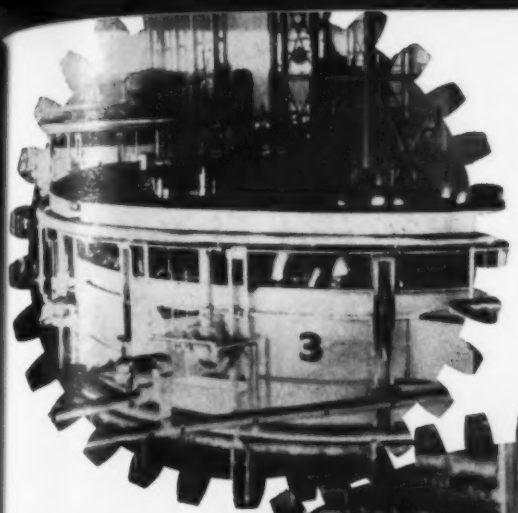
Allegheny Ludlum

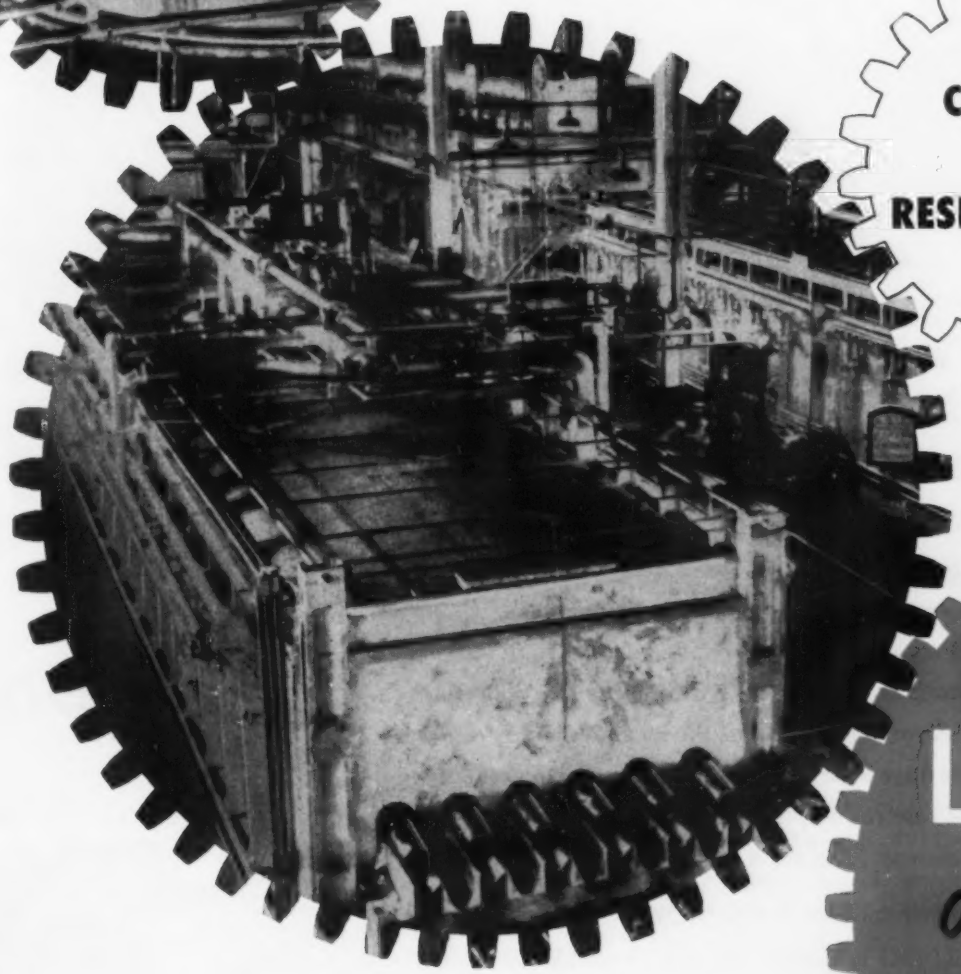
AL
FINE TOOL STEELS
SINCE 1854

WAD 3408

Geared

TO THE NEEDS OF THE NATION





ONE CONTRACT ONE RESPONSIBILITY

It's **LOFTUS** *all along the shel Line*

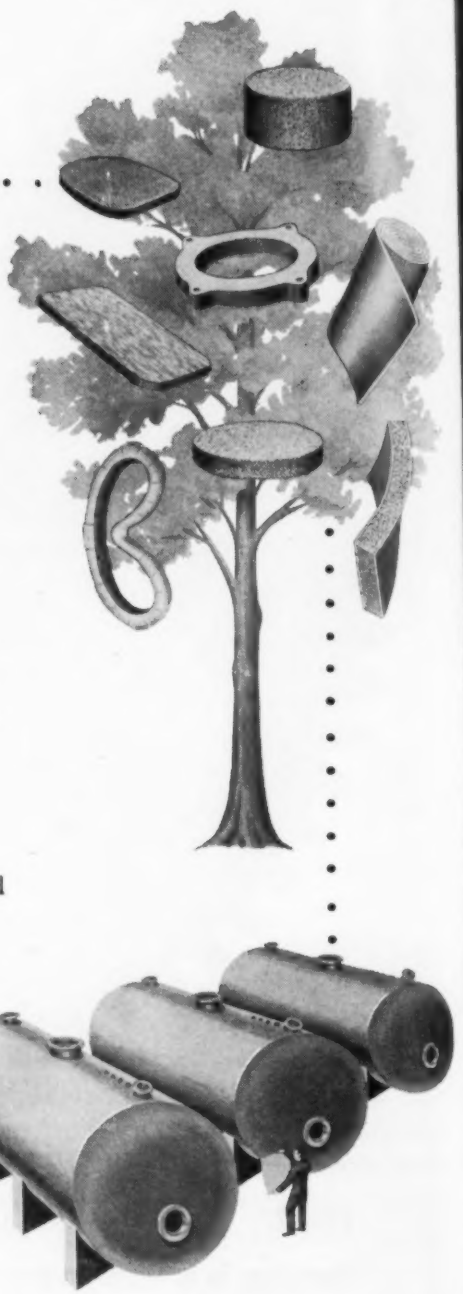
The Loftus organization, one of the largest in the country with *specialists* in all phases of industrial heating, is now, as in former emergencies, engaged in the designing and construction of Forging and Heat Treating equipment for the production of all types of armament.

SMITHFIELD ST. **LOFTUS ENGINEERING** *Corporation* PITTSBURGH, PA.

signers and Builders of Industrial Furnaces

RUBBER GROWS ON TREES . . .

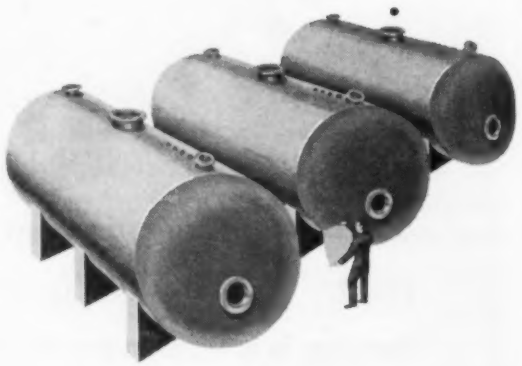
but not in this part of the world



Rapidly increasing demand for rubber products has placed a heavy burden on our natural rubber supply line from the East Indies. Delivery schedules have been prolonged. Rubber manufacturers who are expanding to meet this new demand are often unable to expand their storage facilities in step with uncertain deliveries of raw rubber.

When the SPONGE RUBBER PRODUCTS COMPANY of Shelton, Connecticut was notified recently of a shipment of latex already at sea, they had insufficient storage facilities available. They took their problem straight to ACME TANK & WELDING . . . an order for three large tanks built to their specifications, and built in a hurry. The first of these tanks was delivered in five days, the second the day after, the third four days later . . . well in advance of the scheduled arrival of the raw rubber. Said SPONGE RUBBER'S engineer in charge, "A class A job in my book."

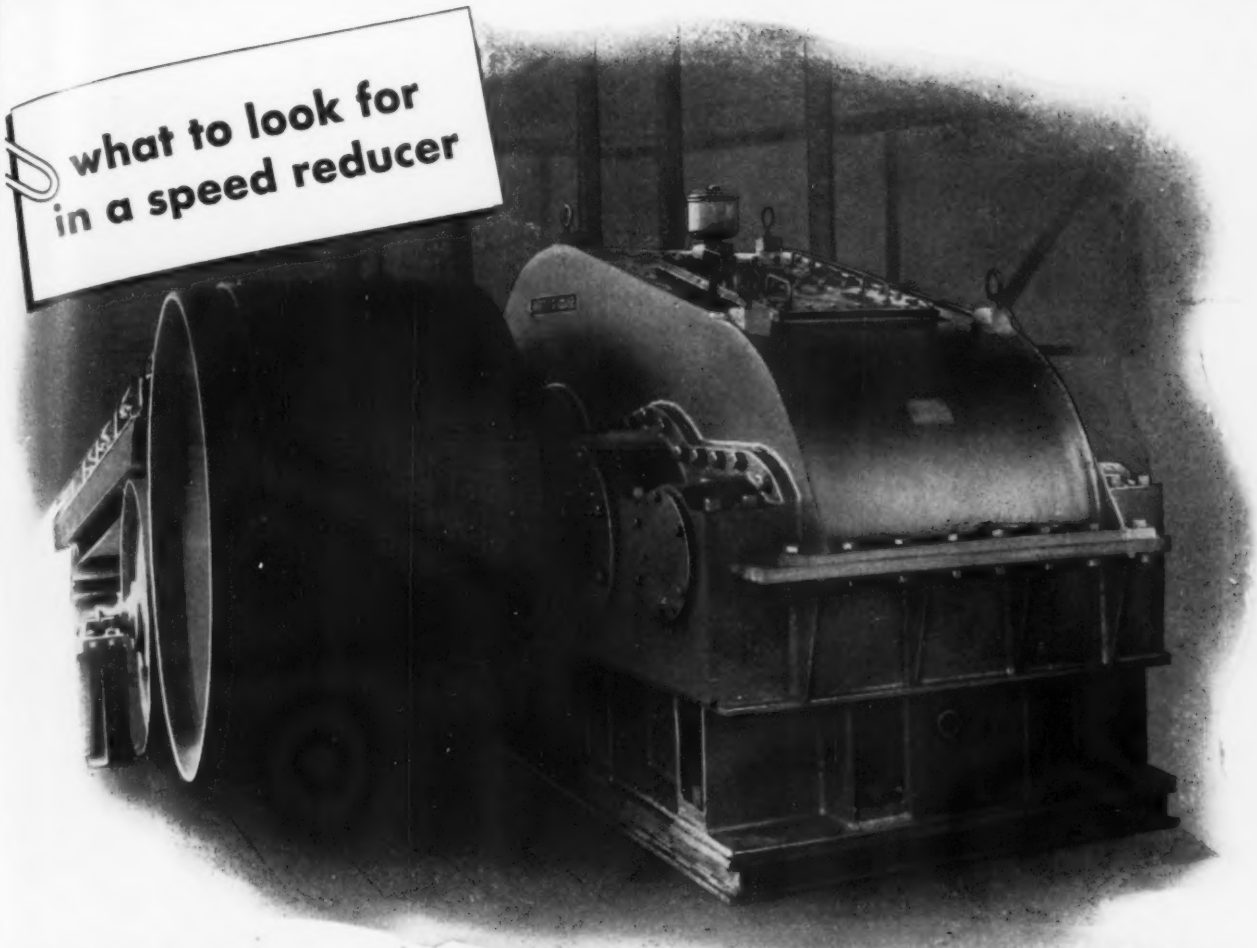
Today when fast delivery is rare, ACME TANK & WELDING is doing everything possible to speed service to its customers, especially in emergencies such as the one faced by the SPONGE RUBBER PRODUCTS COMPANY.



ACME
TANK and WELDING
DIVISION of THE UNITED TOOL & DIE CO.
WEST HARTFORD 10, CONNECTICUT

For all types of steel, stainless, and alloy weldments, designed to meet your requirements, call on ACME today.

- A.S.M.E. Qualified Welders • National Board Approved
- Hartford Steam Boiler Inspection Service • A.P.I. Approved
- Rating Approved by Natl. Assoc. of H.P. & A.C. Contractors
- Underwriters Label and Inspection Service • Navy Approved



look for *A STRONG TIGHT CASE*

National Iron Company did . . . and saved $8,000 with this Westinghouse Speed Reducer installation

The National Iron Company of Duluth, Minnesota, recently conceived a new idea for a conveyor belt drive—overhang the head pulley directly on the speed reducer. A total savings of $8,000 in equipment and installation time was made on this first iron-range application.

Materializing the idea was simple. Selecting a speed reducer that could stand the strain wasn't. The overhung load was 28,800 pounds! A Westinghouse Type-WDH Speed Reducer with its rugged case construction was the answer.

Type-WDH Speed Reducer case is heavily ribbed to provide extra strength at points of greatest stress. Horizontal split construction provides easy accessibility without disturbing the mounting or motor.

You get greater capacity and service life with Westinghouse Speed Reducers because they have:

Taper-hardened helical gears for high efficiency and smooth quiet operation.

Roller bearings for permanent shaft alignment and minimum friction loss.

A simple splash-type oil system for positive and ample lubrication.

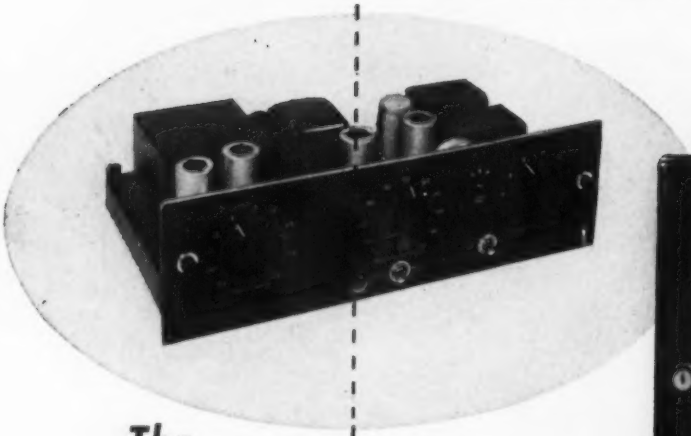
Write today for the complete details as presented in bulletin DB-3700 SR. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Penna.

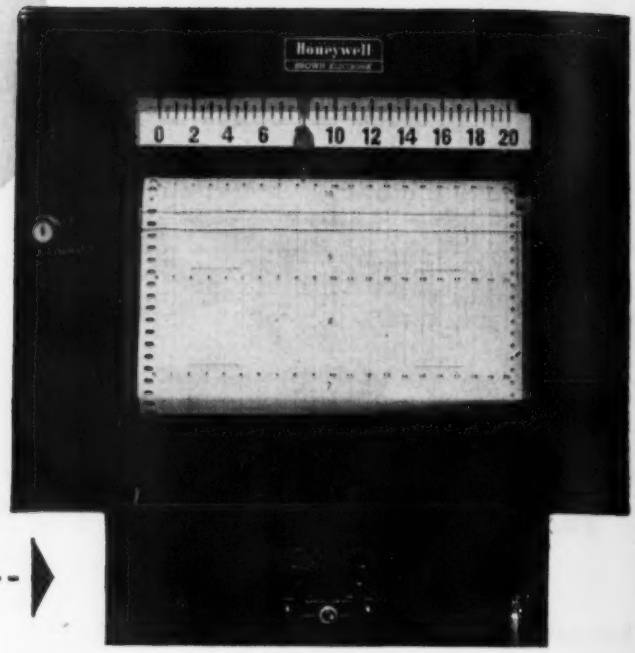
J-07298

YOU CAN BE SURE.. IF IT'S
Westinghouse
MEMBER OF AGMA
GEARED DRIVES

BROWN INSTRUMENTATION IS THE *Plus-Factor*

FOR PULSE FIRING OF YOUR FURNACE





The

Electr-O-Pulse

ELECTRIC PROPORTIONAL CONTROL RELAY

Check These Outstanding Features!

- √ **INDEPENDENCE OF CONTROL ADJUSTMENTS** *Widest range of adjustments; completely non-interacting.*
- √ **COMPACT DESIGN** *Two instruments with integral relays fit on a 24" x 42" panel.*
- √ **SIMPLIFIED SERVICING** *Plug-in chassis makes unit accessible.*
- √ **MANUAL CONTROL** *Relay includes manual control adjustment.*
- √ **FACTORY WIRED** *Integral mounting wired at factory, eliminates errors and simplifies installation.*
- √ **UNIVERSALLY ADAPTABLE** *Can be used with instrument slidewire resistance values from 50 to 1000 ohms.*
- √ **AUTOMATIC RESET** *Compensates for load changes automatically.*

Write for Specification Sheet 195

You can obtain more accurate furnace control with the *Electr-O-Pulse* proportional control relay. It proportions the *on-time* of a contactor, solenoid, or motor valve in accordance with furnace demand . . . delivers an average heat input by changing the ratio of "on" to "off" time.

With automatic compensation for load changes, straight line control on an on-off basis is realized. It is equally adaptable to electric or fuel fired furnaces, and is particularly advantageous where furnace or burner design requires full heat input for proper heat distribution.

The *Electr-O-Pulse* relay may be used as an integral part of any *ElectroniK* electric proportional controller, or as a separate unit for improving performance of existing installations. Check the list of outstanding features . . . then call in your local Honeywell engineer for a discussion of how they will benefit your plant. Branch offices in more than 80 principal cities of the United States, Canada, and throughout the world.

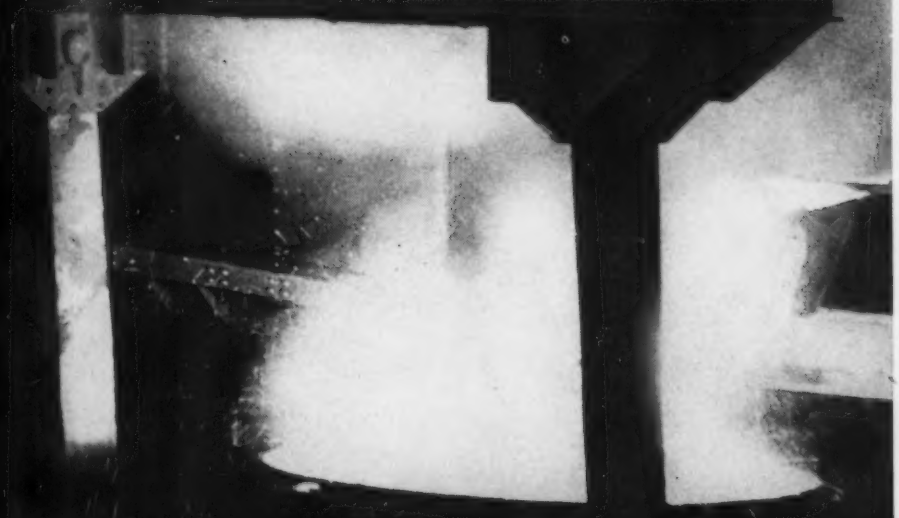
MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, 4483 Wayne Ave., Philadelphia 44, Pa.

MINNEAPOLIS **Honeywell**

BROWN INSTRUMENTS

ALSIFER

effects grain refinement of steel



For grain refinement and grain size control of wrought steels made by both open hearth and electric furnace practice, Alsifer . . . a well-balanced, carbon-free alloy of approximately 40% iron, 40% silicon and 20% aluminum . . . offers several distinct advantages.

First—*a new feature*—Alsifer is now chill cast into pigs to make it more dense and to give it high specific gravity, resulting in higher efficiency and greater economy for the steelmaker.

Second—the high specific gravity of this alloy insures rapid and complete penetration of the slag and metal when Alsifer is added to the ladle or furnace.

Third—its use promotes higher recovery and better control of grain size and deoxidation, with uniform results assured from heat to heat.

Alsifer is produced in electric furnaces under rigidly controlled conditions that give this alloy exceptional uniformity. It is supplied in sizes to meet all metallurgical requirements.

VANADIUM CORPORATION OF AMERICA

420 LEXINGTON AVENUE, NEW YORK 17, N. Y. • DETROIT • CHICAGO • CLEVELAND • PITTSBURGH

MAKERS OF ALLOYS

VANCORAM

CHEMICALS AND META

the magnet that answers THE NEED

Dings New Improved Lifting Magnet . . .
Weighs Less, Lifts More, and Lasts Longer

THIS latest Dings magnet has *all* the features necessary for maximum scrap yard performance. A few examples . . .

WELDED STEEL CONSTRUCTION—eliminates the moisture danger, makes a strong rigid magnet that can take the hard blows.

LIGHTER WEIGHT—*More* of the weight your crane is carrying will be payload. A balanced magnetic circuit of advanced design makes this difference.

MAXIMUM POWER, LONGER—No. 1 reason for this is less heat rise due to the improved magnetic circuit. In addition, a new, finer insulating compound dissipates strength-sapping heat, prevents electrical leakage between coil wires.

Those are the *big* new features. There are a dozen other important ones you'll be interested in.

FOR FULL DETAILS, WRITE for the LIFTING MAGNET CATALOG.

DINGS MAGNETIC SEPARATOR CO.
4709 W. Electric Ave., Milwaukee 46, Wis.

Dings Certified
MAGNETIC STRENGTH

FLAT SPRING STEEL

Photo courtesy U. S. Tool Company, Inc.

You can always count on Roebling for absolutely uniform quality

FOR FLAPPER VALVES, shoe shanks, measuring tapes! For steel rules, curtain springs, snap springs, lock springs, drop wires, sinker steel and a thousand and one other exacting uses, you'll find that Roebling high carbon flat mechanical spring steel is unsurpassed.

Roebling's complete facilities for producing flat spring steel give us positive control over all phases of manufacture. The final product is dimensionally and metallurgically uniform... cuts down machine stoppages... minimizes rejects. And Roebling flat spring steel is made as you want it—annealed, hard rolled untempered; scaleless tempered; tempered and polished, blued or strawed.

Large quantities of Roebling specialty wires—flat, round and shaped—are required today in the national rearmament program. You can look to us, however, to do everything possible to meet your requirements. John A. Roebling's Sons Company, Trenton 2, New Jersey.

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When Experience Counts-

RELIANCE *Job-Fitted* **PRODUCTS AND SERVICES**

COLD ROLLED STRIP STEEL

Coils . . . Cut Lengths . . . All Tempers
Slit, Sheared, Deburred
and Round Edge
From WAREHOUSE
or
DIRECT-FROM-MILL

SHEETS

Cold Rolled . . . Hot Rolled
Hot Rolled Pickled . . . Long Terne
Galvanized
Standard or production sizes
or cut to actual working
dimensions
from
WAREHOUSE STOCKS

Running a sheet and strip steel warehouse business in recent months has been much like walking a circus tight rope.

Just filling orders was sometimes tough enough. The trick was to fill them in a way to keep a steady balance of satisfied customers. Our way was . . . and still is . . . to spread available tonnages around for the greatest amount of good for the largest number.

Our customers have thus been able to bank on reasonable, sometimes generous, but always fair and consistent shipments, month after month.

DEPENDABLE DAN
OUR CUSTOMERS' MAN

Among other nice things, one of them told a Reliance salesman recently: "Your outfit is one we can depend on. What you promise, you deliver."

STEEL—BACKBONE OF AMERICA'S ARMAMENT

For Immediate Action Call The Nearest Reliance Plant or Office:

DETROIT STEEL CORPORATION

PRODUCERS OF
Coke and Coal Chemicals • Pig Iron • Ingots
Slabs • Sheet Bars • Billets • Wire Rods
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RELIANCE STEEL DIVISION

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What makes an industry progressive?

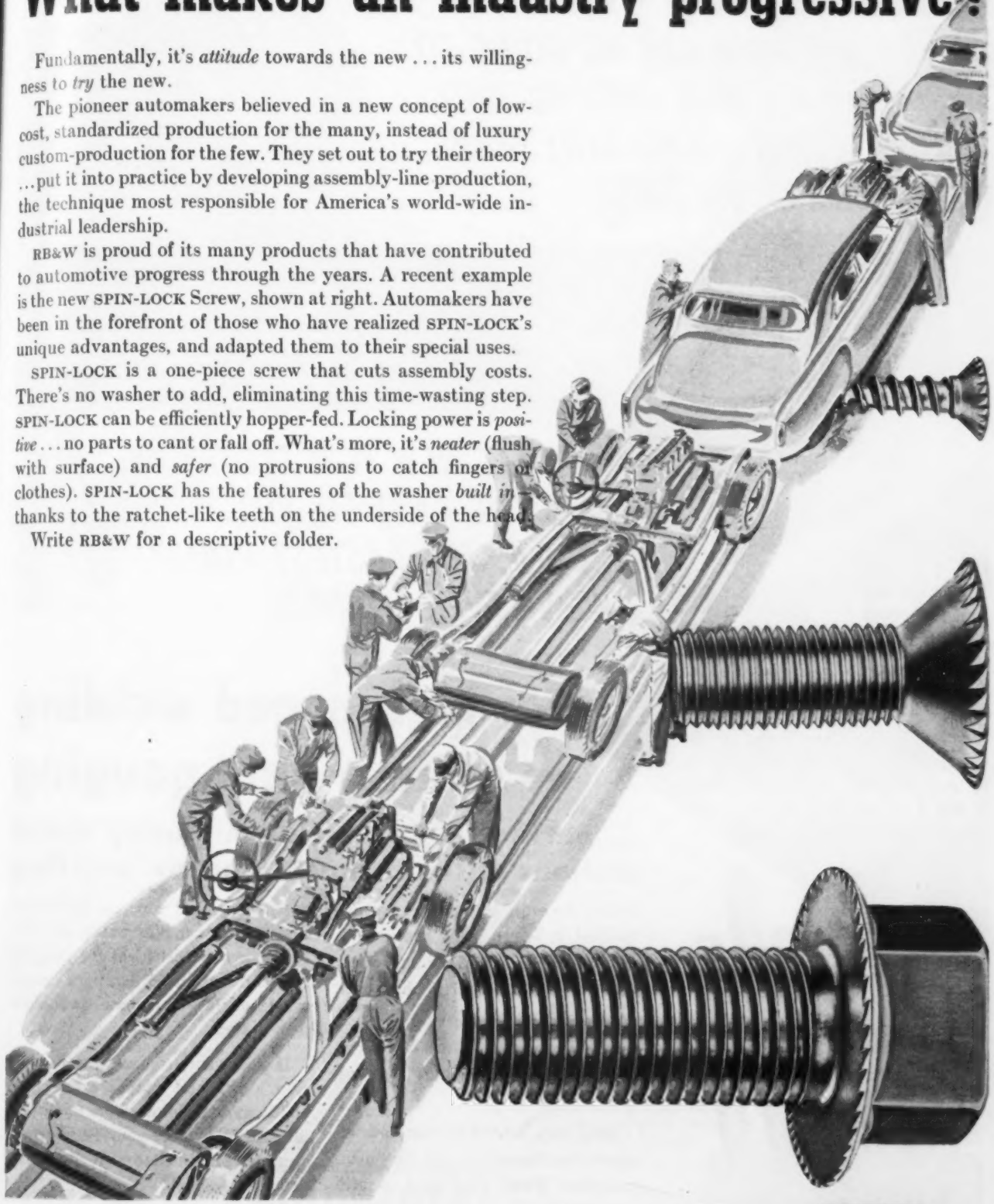
Fundamentally, it's *attitude* towards the new . . . its willingness to *try* the new.

The pioneer automakers believed in a new concept of low-cost, standardized production for the many, instead of luxury custom-production for the few. They set out to try their theory . . . put it into practice by developing assembly-line production, the technique most responsible for America's world-wide industrial leadership.

RB&W is proud of its many products that have contributed to automotive progress through the years. A recent example is the new SPIN-LOCK Screw, shown at right. Automakers have been in the forefront of those who have realized SPIN-LOCK's unique advantages, and adapted them to their special uses.

SPIN-LOCK is a one-piece screw that cuts assembly costs. There's no washer to add, eliminating this time-wasting step. SPIN-LOCK can be efficiently hopper-fed. Locking power is *positive* . . . no parts to cant or fall off. What's more, it's *neater* (flush with surface) and *safer* (no protrusions to catch fingers or clothes). SPIN-LOCK has the features of the washer *built in* — thanks to the ratchet-like teeth on the underside of the head.

Write RB&W for a descriptive folder.



RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

Plants at: Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill., Los Angeles, Calif. Additional sales offices at: Philadelphia, Detroit, Chicago, Chattanooga, Dallas, Oakland. Sales agents at: Portland, Seattle.

RB&W
THE COMPLETE QUALITY LINE

106 YEARS MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG

JIM, HOW ARE WE GOING TO DO ALL THIS CUTTING AND WELDING...AND STILL MAKE DELIVERY ON TIME?
THAT NEW P&H ELECTRODE IS THE ANSWER, BILL. DH-4, THE FASTEST ROD WE'VE EVER BURNED!

NEW P&H DH-4 Electrode

3 Sizes Available

1/8", 5/32" and 3/16"

Operates off DC welder on straight polarity or AC welder with minimum open circuit voltage of 80 volts.

For high-speed welding — cutting and gouging

...perfect X-Ray welds on heavy metal sections without machining or scarfing

This is the most unusual rod ever developed. It has so many applications that the American Welding Society does not have an AWS number for it.

Because of its wide range of usefulness the new DH-4 rod has shown outstanding economies in welding time and costs.

Here are a few of its many advantages: Fast deposition rate. Easy manipulation. Welds mild steel to mild steel without processing. Has extremely high penetration — 1/4-inch with 1/8-inch rod at 300 amps. Cuts time on horizontal fillet welds, flat butt welds, and vertical down welds. Ideal for gouging and cutting. Gives excellent results on Hadfield manganese and high-carbon steels.

If you want to give your production a lift and reduce your costs, you'll want to know more about the unusual DH-4. See your P&H representative or distributor. Write us for details.

P&H

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Excavators • Overhead Cranes • Hoists • Arc Welders and Electrodes • Soil Stabilizer
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These are the special purpose steels that set Crucible apart from most other steel companies. For these special steels must be so carefully compounded, and so sensitively handled that, in most cases, they cannot be mass produced.

Such steels include those designed for use under severe conditions of heat or cold, stress, strain, or wear. For example: Crucible high-speed tool steels are in the whirring machines that cut and shape the toughest metals; Crucible hollow drill steels work around-the-clock digging mines and quarries, and Crucible stainless steels put a sparkle with a purpose in our kitchens.

If you have an application that calls for a special steel, Crucible's metallurgical staff stands ready to help you. CRUCIBLE STEEL COMPANY OF AMERICA, Chrysler Building, New York 17, N. Y.

CRUCIBLE first name in special purpose steels

51 years of Fine steelmaking

Spaulding Works, Harrison, N. J. • Midland Works, Midland, Pa. • Park Works, Pittsburgh, Pa. • Spring Works, Pittsburgh, Pa.
National Drawn Works, East Liverpool, Ohio • Sanderson-Halcomb Works, Syracuse, N. Y. • Trent Tube Company, East Troy, Wisconsin

You saw this ad in the Saturday Evening Post, Time, Newsweek, Business Week

especially tool steels!

Crucible Tool Steels have been pampered pets every day of the 51 years Crucible has led in this highly specialized field. That's why tool steel users, assured of getting what they want from Crucible, have kept us the country's number one tool steel producer.

Since Industry is constantly opening new fields that require new tool steels, Crucible's interest in their further development and improvement goes on unabated. You can profit from the wealth of knowledge gained by Crucible in the application of these steels to thousands of uses. The unparalleled experience of our metallurgists is freely available to you.

That's why it pays to get *all* your tool steel requirements from Crucible.

write for your selector today

If you haven't gotten your handy tool for selecting tool steels, write: Dept. I, Crucible Steel Company of America, 405 Lexington Avenue, New York 17, New York

3 colors, 9" diameter

CRUCIBLE first name in special purpose steels

51 years of Fine steelmaking

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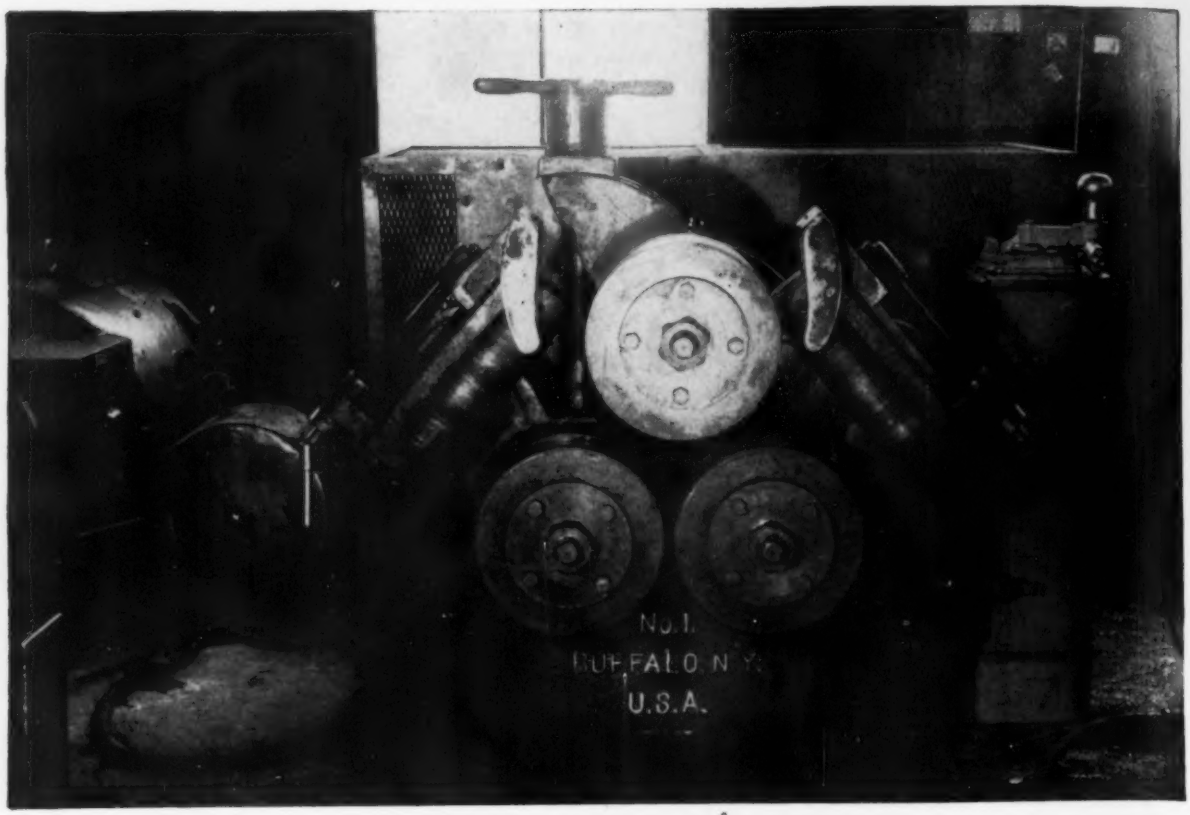
THE PORTLAND COMPANY ROLLS OUT THE *Rush Jobs*



—and rolls 'em out accurately with this

"Buffalo" **BENDING ROLL**

● The Portland Company, Boilermakers, Machinists and Founders, Portland, Me., has a reputation for prompt, accurate work. One reason is this "Buffalo" No. 1 Vertical Roll. "All in a day's work" recently was an order for 94 rings of 36½" outside diameter, rolled leg-in from 2" x 2" x ¼" angle. Top photo is a partial group of the rings, completed on time, as usual.

If you bend angles, tees, flats, pipe, channels and other structurals into curved shapes, you're always money and time ahead with a "Buffalo" Bender. Rolls are changed quickly for different jobs, and one man can easily produce his payload and then some. If you're looking for lower metal bending costs, write for Bulletins 352-B and 3344-A for all information.

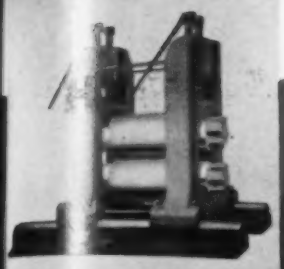
"Buffalo" MACHINE TOOLS

BUFFALO FORGE COMPANY

492 BROADWAY BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING PUNCHING SHEARING CUTTING BENDING



EARLY COLD MILL . . . about 1901

UNITED HIGH SPEED CONTINUOUS COLD MILL .. speeds up to 6,000 ft. per minute.

50
YEARS AGO

Mom Did Most of the Canning

BUT not any more. Today, the world's choicest foods, with all their goodness and flavor locked in neat, sanitary tins, reach our pantry shelves in infinite variety and abundance.

The phenomenal growth of the canning industry—America's largest user of tin plate—would not have been possible without the development of new and better steel rolling and coating processes.

In the contributions to better living that United has been able to make through a half century of pioneering in the design and construction of more efficient rolling equipment, it takes great satisfaction.

As always, United's engineers will be glad to work with you on your plans for increased tin plate production.

1901 Golden Anniversary 1951

UNITED

ENGINEERING AND FOUNDRY COMPANY

Pittsburgh, Pennsylvania

Plants at PITTSBURGH • VANDERGRIFT • NEW CASTLE • YOUNGSTOWN • CANTON

Designers and Builders of Ferrous and Non-Ferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.

Subsidiaries: ADAMSON UNITED COMPANY, AKRON, OHIO • LOBDELL UNITED COMPANY, WILMINGTON, DELAWARE • STEDMAN FOUNDRY AND MACHINE CO., INC., AURORA, INDIANA

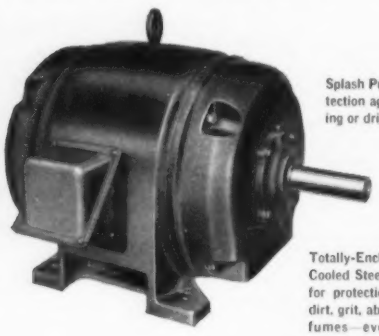
Wagner
ELECTRIC MOTORS
...the choice of leaders in industry

wherever motor hazards prevail...

GUARD PRODUCTION WITH Wagner Protected Motors

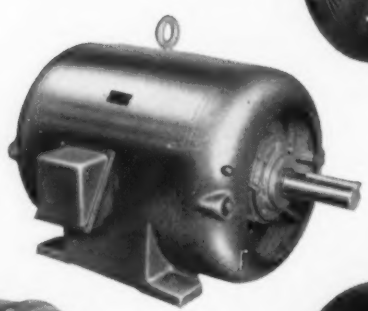
Do you use motors in locations where dirt, filings, moisture, splashing liquids, explosive gases, acid fumes, or other motor hazards prevail? If you do —no matter how severe the operating condition—Wagner can furnish the *right* motor for your purpose, adequately protected for specialized requirements.

Wagner protected type motors are known for completely dependable operation in their specific applications. They are backed by sixty years of motor building experience. Five protected-type Wagner Motors are shown below. Bulletin MU-185 gives full information . . . write for your copy.



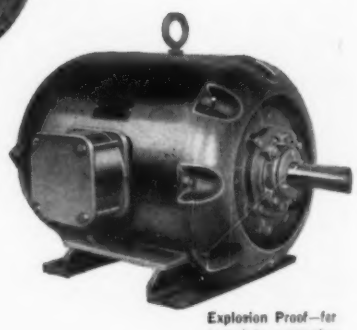
Splash Proof—for protection against splashing or dripping liquids.

Totally-Enclosed Fan-Cooled Steel Frame—for protection against dirt, grit, abrasives, or fumes—even in abnormal quantities.



Totally-Enclosed Fan-Cooled Cast Iron Frame—for protection against corrosion from fumes or moisture.

Drip Proof—for protection against dripping liquids or falling particles.



Explosion Proof—for complete protection in hazardous atmospheres.

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6403 Plymouth Ave., St. Louis 14, Mo., U.S.A.

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS — AIR AND HYDRAULIC

BRANCHES IN 31 PRINCIPAL CITIES

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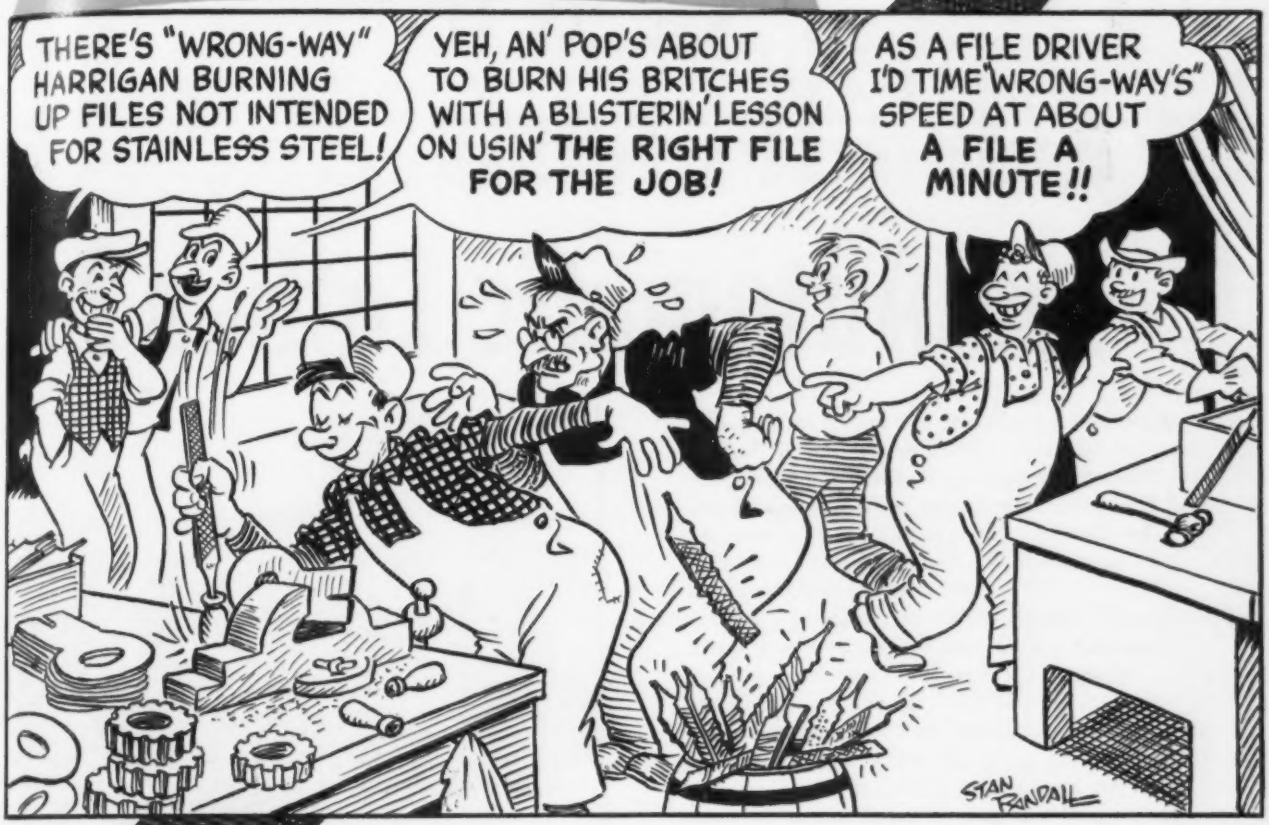
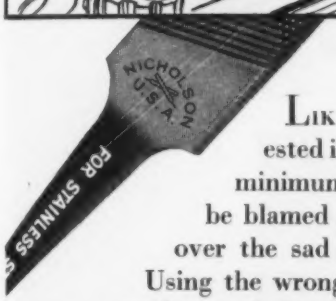
POP'S school of Filing


THERE'S "WRONG-WAY" HARRIGAN BURNING UP FILES NOT INTENDED FOR STAINLESS STEEL!
YEH, AN' POP'S ABOUT TO BURN HIS BRITCHES WITH A BLISTERIN' LESSON ON USIN' THE RIGHT FILE FOR THE JOB!
AS A FILE DRIVER I'D TIME "WRONG-WAY'S" SPEED AT ABOUT A FILE A MINUTE!!
STAN RANDALL



LIKE any foreman interested in high production with minimum tool wastes, Pop can't be blamed for "blowing his top" over the sad scene enacted above. Using the wrong file for the job is as costly a tool abuse as using any file carelessly. Take stainless steel, for example:

Stainless steel is a tough, dense metal which tends to have a wearing effect on all cutting tools —and files are no exception. Better results are obtained when Nicholson or Black Diamond files "For Stainless Steel" are selected. These are made with specially sharpened teeth to assure faster cutting and longer file life. They are made in the same types and sizes as regular-purpose files. "For Stainless Steel" is stamped on the tang. Sold through industrial distributors.

THE NATIONAL DEFENSE PROGRAM calls for again conserving steel. You can aid by making files last longer—(1) through correct use and proper care of files and (2) through use of *The right file for the job.* The following booklets, handed to purchasing and production heads, are valuable helps. Write for as many copies as you can use judiciously.

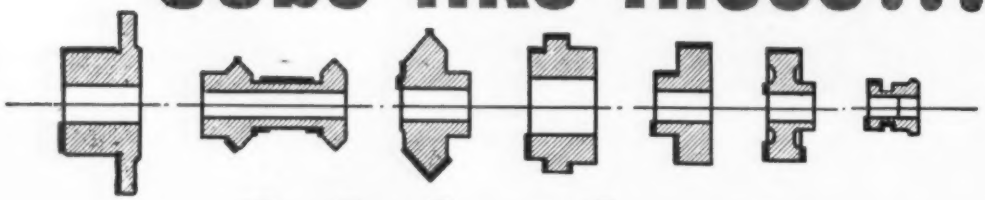
"TEN SPECIAL FILE TYPES"

"FILE FILOSOPHY"
(on kinds, use and care of files)

NICHOLSON U.S.A. **NICHOLSON FILE CO. • 31 ACORN STREET • PROVIDENCE 1, RHODE ISLAND** BLACK DIAMOND TRADE MARK
(In Canada, Port Hope, Ont.)

NICHOLSON . . . A FILE FOR EVERY PURPOSE

Jobs like these...



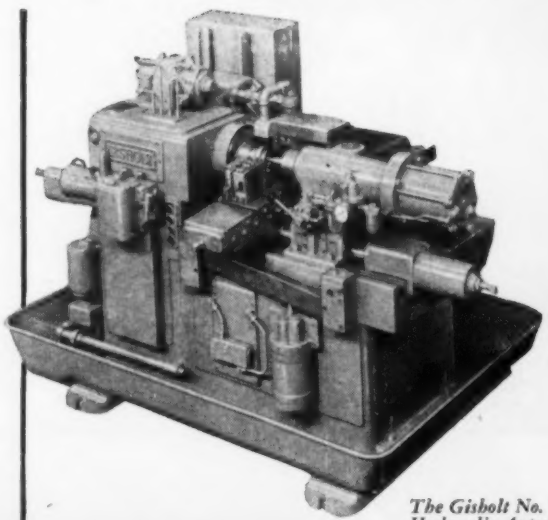
on a Job-Lot basis...

on Automatic Lathes?

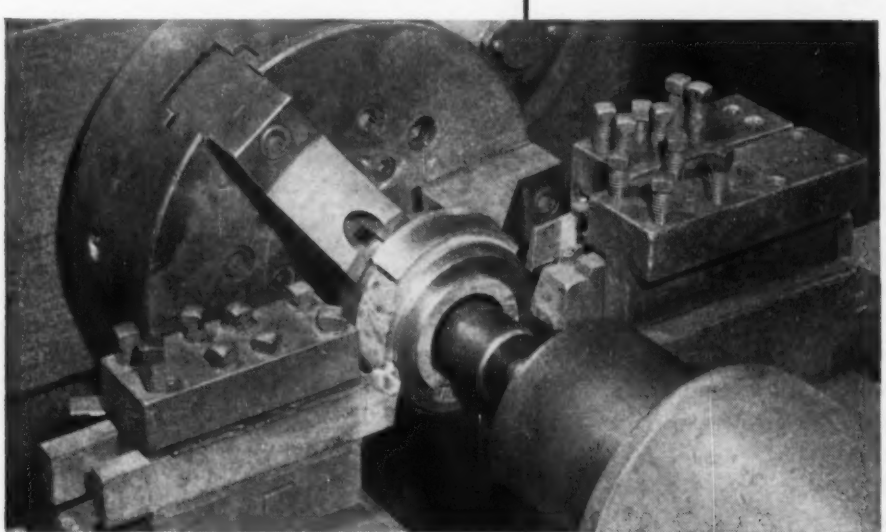
Absolutely! And these are only 8 of over 200 actual small-lot jobs handled on Gisholt No. 12 Hydraulic Automatic Lathes. The Crompton and Knowles Loom Works of Worcester, Mass., has *four* No. 12 Hydraulics busy producing and saving on work like this . . . and all with standard tool blocks!

Job-lot work like this—and like yours—is a natural for the No. 12 Automatic. The cost is no more than a hand-operated lathe for work this size . . . yet you have the added advantages of automatic machining and one-man operation of two or more machines.

If you have contract work like this, now or pending, it will pay you well to get the facts on the No. 12 Hydraulic Automatic Lathe. There's a big 24-page catalog free for the asking.



The Gisholt No. 12 Hydraulic Automatic Lathe gives you speed and accuracy plus *easy set-up.*



THE GISHOLT ROUND TABLE
represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

GISHOLT MACHINE COMPANY
Madison 10, Wisconsin

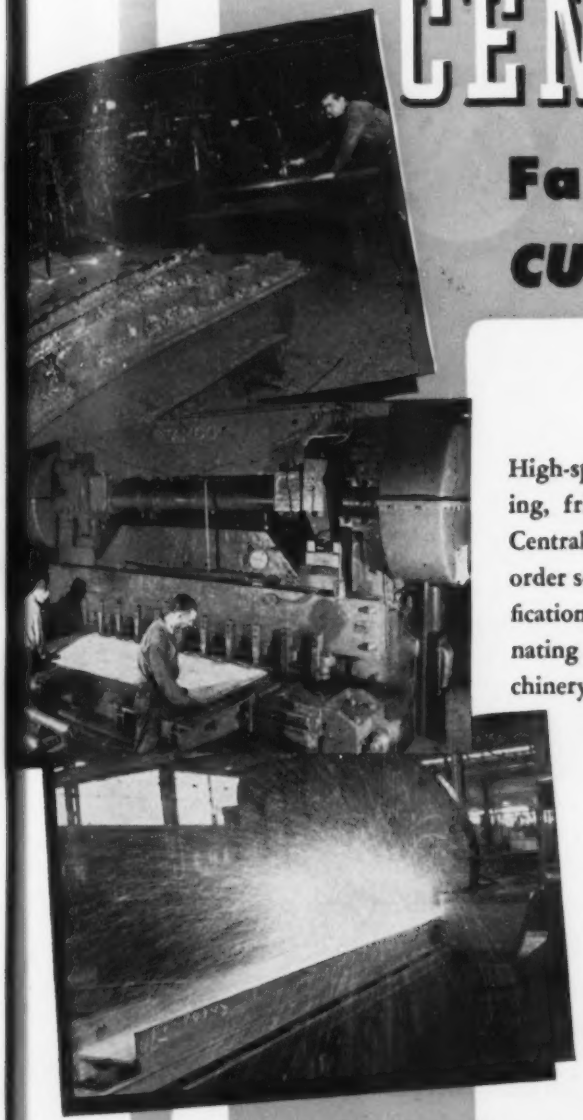
TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

EN AND MACHINES *Serve You* FAITHFULLY

...When You Use

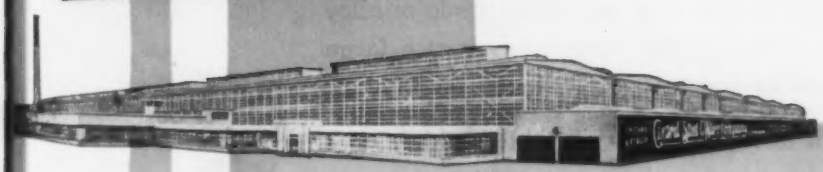
CENTRAL STEEL'S

Fast, Accurate
CUT-TO-ORDER Service



High-speed, precision equipment for flame cutting, shearing, friction sawing, hack sawing and slitting enables Central Steel to offer the fastest, most accurate cut-to-order service possible. All materials are cut to your specifications with physical properties undisturbed . . . eliminating waste and the need for costly, seldom-used machinery in your plant. When you order from Central Steel, materials are quickly cut, bundled and tagged — ready for IMMEDIATE, DEPENDABLE DELIVERY to your production line.

Take advantage of this service . . . *by ordering from Central Steel—the warehouse with large stocks of ALL metals for EVERY purpose.*



Your Best Source for Materials

Complete Stocks of
t Rolled • Cold Finished
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pper • Brass • Aluminum
Expanded Metal •
Structurals for
Immediate Delivery

Central Steel & Wire Company

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P. O. Box 5310-A
REpublic 7-3000

DETROIT 12, MICH.
13400 Mt. Elliott Ave.
TWinbrook 2-3200

CINCINNATI 14, OHIO
Box 148 Annex Sta.
AVon 2230

MILWAUKEE 14, WIS
6623 W. Mitchell St.
EVergreen 4-7400

WHY SO MANY when 2 will do?

No need to complicate things. Look at it this way.

Extra equipment, just like extra alloy steels, can cause confusion and cost more money. For example, we know a number of plants that have found how economical and easy it is to use just 2 alloy steels for maintenance parts like gears, shafts, pinions, etc.

When you *fix it so it stays fixed* with one of these 2 steels, you also get easier fabrication and less costly heat treatment. You can now use one tempering grade of alloy steel or one case-hardening grade on most jobs—instead of worrying about a large number of A.I.S.I. grades. And both steels are stocked in local Carpenter warehouses.

An unusual book called "2 Steels" tells all about Carpenter's simplified alloy steel program . . . 2 aircraft quality alloy steels that can replace many. Write for your copy of "2 Steels".

THE CARPENTER STEEL COMPANY
121 W. Bern Street, Reading, Pennsylvania

Only Carpenter Gives You This Easy Way to *Fix It So It Stays Fixed!*

Sixty million is a lot of anything and that is the number of items Townsend can produce in one working day. Lately it just isn't enough to go around. We have strained every facility and every source of raw material to keep our production above average—but we still can't keep ahead of our orders.

So, if our delivery date for large and small cold-headed solid rivets and tubular rivets, special nails, fasteners, parts and other gadgets is longer than usual, please bear with us.

We believe our backlog of orders is in some measure caused by the savings we have created for our customers—so we intend to keep quality up to our rigid standards, no matter how busy we get.

Even if you must wait for delivery—you can count on Townsend quality control which has back of it 135 years of experience in wire drawing and cold-heading.

Townsend

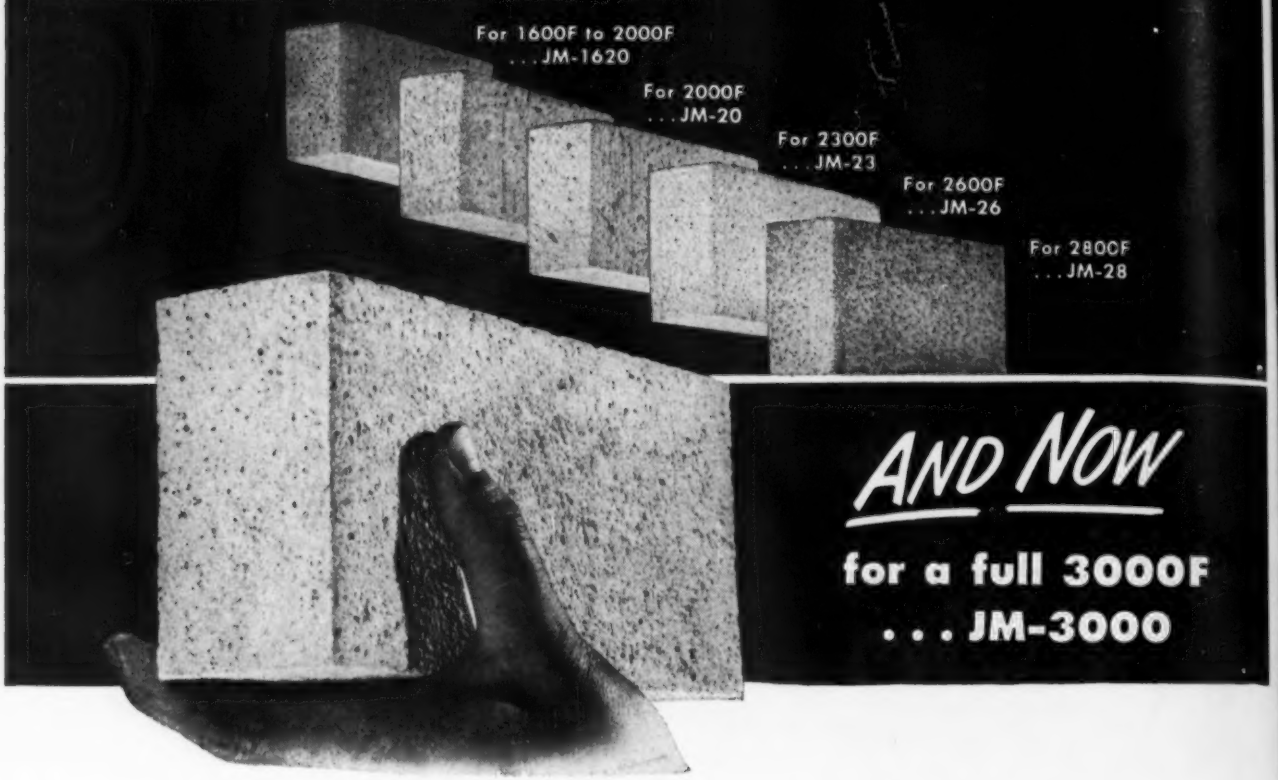
COMPANY • ESTABLISHED 1816

Plants—New Brighton, Pa. • Chicago 38, Ill.

Division Sales Offices—Philadelphia, Detroit, Chicago

Sales Offices in Principal Cities

MEET the family of Johns-Manville Insulating Fire Brick . .



AND NOW for a full 3000F . . . JM-3000

HERE IS AN OUTSTANDING FAMILY of insulating fire brick for back-up or exposed use . . . the only family of its kind . . . that gives you a complete range . . . a *quick heating* insulating fire brick for every purpose.

By taking advantage of the quick heating characteristics of these insulating fire brick, you'll benefit through important savings in fuel because of the quicker rise to proper operating temperature in the furnace. This is a result of the low heat storage capacity and low thermal conductivity characteristics of the brick. These factors are especially important where furnaces are being intermittently operated.

The same materials can also be obtained in large size units as Johns-Manville Insulating Fireblok. This product has many advantages over the smaller size fire brick, from both a construction and stability standpoint. They can be quickly applied because they are easy to cut and fit. J-M Insulating Fireblok provide additional heat savings because they reduce the number of joints, and require less mortar for bonding.

Why not have a Johns-Manville insulation expert call to tell you more about ways in which you can save by using these insulations in your furnaces. Write Johns-Manville, Box 290, New York 16, N. Y. for further information.

	JM-1620	JM-20	JM-23	JM-26	JM-28	JM-3000
Densities, lb per cu ft	29	35	42	48	58	63-67
Transverse Strengths, psi	60	80	120	125	120	200
Cold Crushing Strengths, psi	70	115	170	190	150	400
Linear Shrinkage,† percent	0.0 at 2000 F	0.0 at 2000 F	0.3 at 2300 F	1.0 at 2600 F	4.0 at 2800 F	0.8 at 3000 F
Reversible Thermal Expansion, percent	0.5—0.6 at 2000 F	0.5—0.6 at 2000 F	0.5—0.6 at 2000 F	0.5—0.6 at 2000 F	0.5—0.6 at 2000 F	0.5—0.6 at 2000 F
Conductivity* at Mean Temperatures						
500 F	0.77	0.97	1.51	1.92	2.00	3.10
1000 F	1.02	1.22	1.91	2.22	2.50	3.20
1500 F	1.27	1.47	2.31	2.52	3.00	3.35
2000 F	—	1.72	2.70	2.82	3.50	3.60
Recommended Service						
Back up	2000 F	2000 F	2300 F	2600 F	2800 F	3000 F
Exposed	1600 F	2000 F	2300 F	2600 F	2800 F	3000 F

† *24-hr simulative service panel test for JM-3000; 24-hr soaking period for other brick.*

* *Conductivity is expressed in Btu in. per sq ft per F per hour at the designated mean temperatures.*

Note: Above tests are in accordance with A.S.T.M. tentative standards.

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville First in INSULATIONS

DESIGNERS AND BUILDERS OF THE WORLD'S LARGEST CRANES
Alliance
LADLE CRANES • GANTRY CRANES • STRIPPER CRANES • SOAKING PIT CRANES • FORGING MANIPULATORS • OPEN HEARTH CHARGING MACHINES
SLAB AND BILLET CHARGING MACHINES • SPECIAL MILL MACHINERY
STRUCTURAL FABRICATION

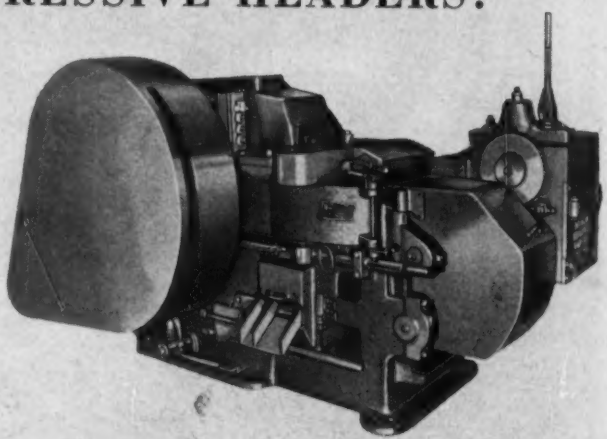
THE ALLIANCE MACHINE COMPANY

Main Office
ALLIANCE, OHIO

Pittsburgh Office
1622 OLIVER BLDG., PITTSBURGH, PA.

COLD-FORGE YOUR "GADGETS" ON NATIONAL PROGRESSIVE HEADERS!

Multi-Station Machine Produces Close-Tolerance Parts *Seven to Fifteen Times Faster* Than Machining Methods . . . Reduces Material Waste Up to 50% . . . .



National Progressive-Type Headers are considered "The Gadget-Makers of Cold-Forging" because their range includes a wide variety of odd-shaped metal parts.

In the Progressive Header Method, the blank is cut off and progressively transferred through two or more sets of punches and dies, producing work previously considered too complex for high-speed cold-forging.

If your work involves double and triple extrusion—or multiple heading in two or more die impressions—then it is especially suited to the National Progressive Header Method.

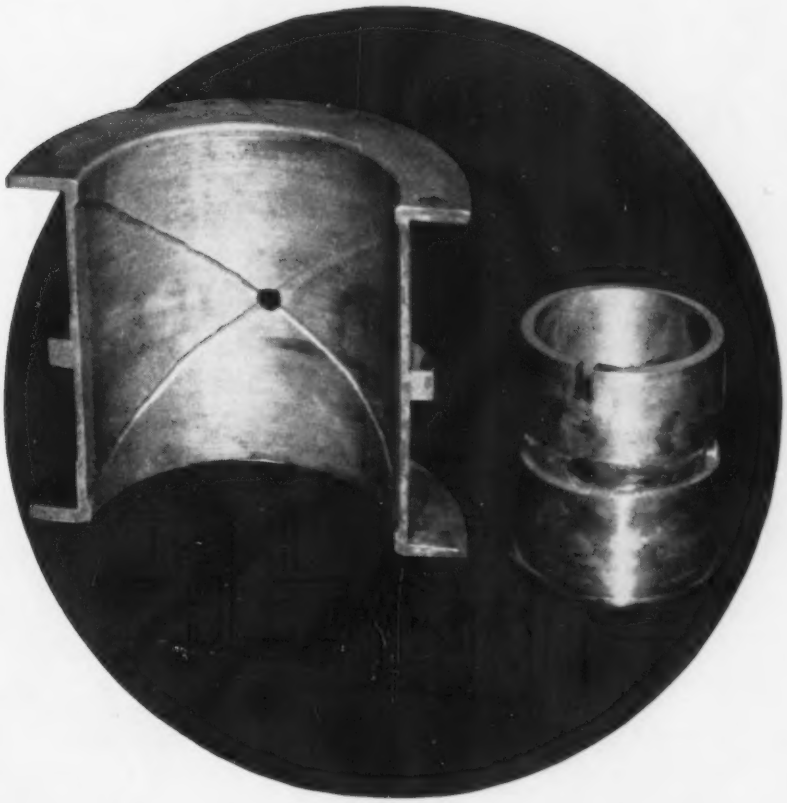
THIS DOOR IS ALWAYS OPEN

Let us help you apply National's experience in hot and cold forging to your jobs. Send us prints or samples of your work, or better yet, pay us a visit. No obligation.

NATIONAL
MACHINERY COMPANY
TIFFIN, OHIO.

DESIGNERS AND BUILDERS OF MODERN FORGING MACHINES—MAXIPRESSES—COLD HEADERS—AND BOLT, NUT, RIVET, AND WIRE NAIL MACHINERY

Hartford Detroit Chicago



PRODUCED: BEARINGS THAT LAST 3 TIMES LONGER

An example showing how National Bearing Division has helped lick costly maintenance problems

AIR that's laden with dust and scale can be rough on bearings—as a large Midwest steel plant found out with an average of just 2 months' service on bearings in charging car wheels and edgers. Replacement labor and expense were going way out of line, when National Bearing Division stepped into the picture.

Our engineers made a special study of this mill's problem. As a result of this study they recommended a hydraulic bronze, both for its superior anti-frictional qualities and its high abrasion-resistance. Special methods of alloying and pouring, developed through N-B-M metallurgical research, insured sounder and denser castings of this bronze—further increasing its resistance to wear and abrasion.

Result? These bearings last 3 times as long as the bronze formerly used! Replacement labor and expense took a nosedive.

This actual example of how National Bearing Division saved money for a customer proves two important points: *first,* that N-B-M has the facilities for thorough research on proper alloying, and *second,* that we have the engineering skill to apply the fruits of this research to our customer's problems on . .

Non-Ferrous Bearings and Castings—
As-Cast or Machined

Bronze Bars—
As-Cast or Machined; Cored, Solid, Hexagon

Babbitt Metals—
For every type of bearing service

AMERICAN **Brake Shoe** COMPANY

NATIONAL BEARING DIVISION
4923 Manchester Avenue • St. Louis 10, Mo.

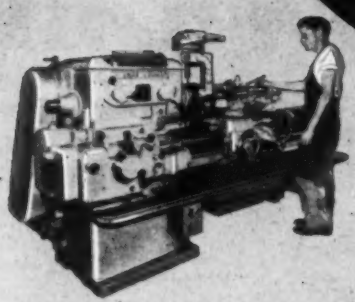
PLANTS IN: ST. LOUIS, MO. • MEADVILLE, PA. • NILES, OHIO • PORTSMOUTH, VA. • ST. PAUL, MINN. • CHICAGO, ILL.

"300% Production Increase"

"Versatile Above All Others"

. . . reports LELAND ELECTRIC CANADA, LTD.
Motor Manufacturers
Guelph, Ontario, Canada

It pays to expand with Lodge & Shipley Lathes!

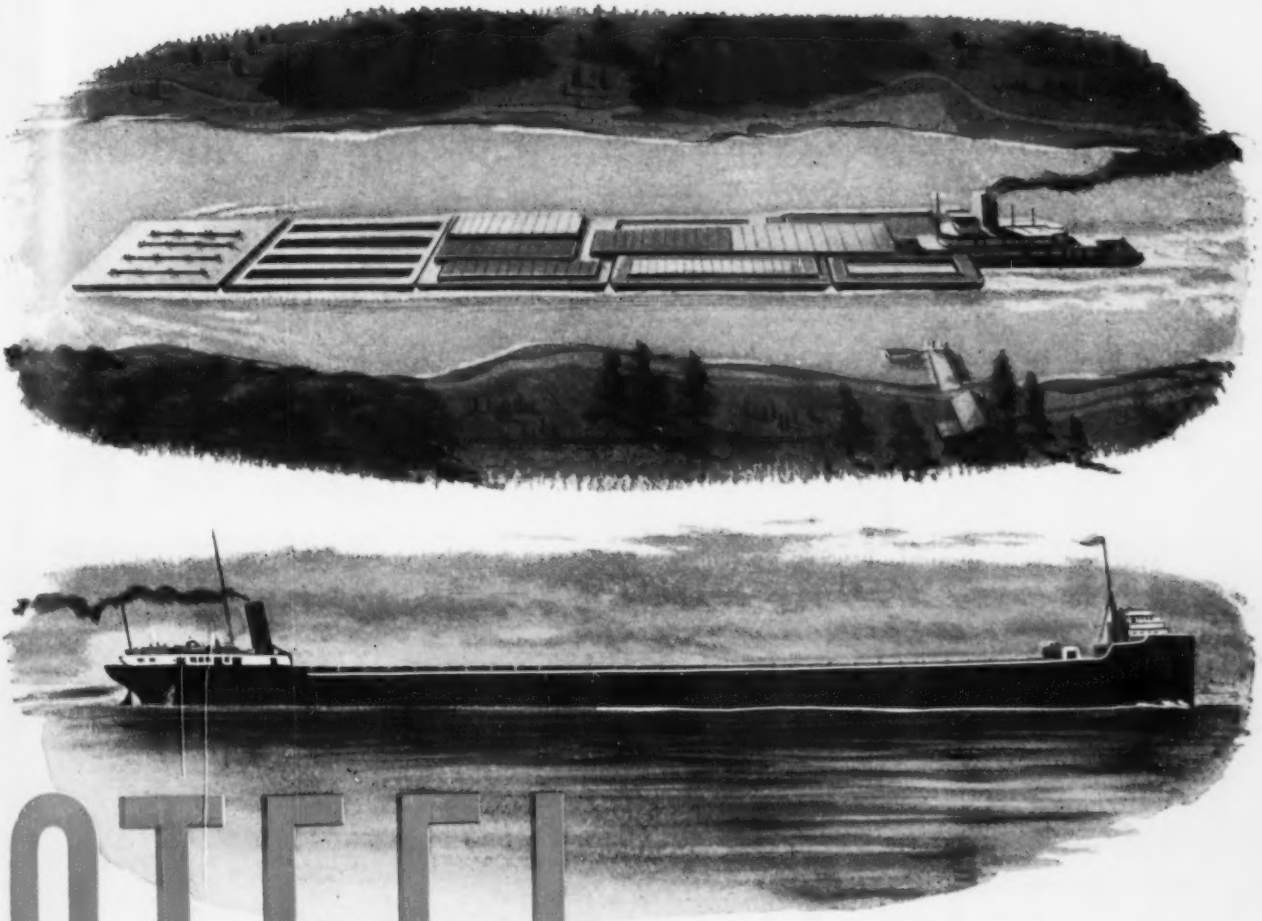


Production-rated *by users*, Lodge & Shipley COPYMATIC lathes show significant production increases and savings on every application. If you require new lathes for expanded production, consider that one Copymatic will do the work of several conventional lathes. You'll save valuable floor space and manpower—still achieve higher productivity with fewer lathes.

For example, in the illustration, the diameters on a C-1138 steel motor shaft are being turned automatically by the COPYMATIC Lathe. Carbide tools are being used with .0085 feed at 300 S.F.P.M. RESULTS: "300% more production" than by former methods! You, too, can obtain similar production increase with the Copymatic.

Let a Lodge & Shipley Representative show you how the COPYMATIC gives the *versatility* of the engine lathe, *productive capacity* of automatic duplication (with instant changeover) *without* the limited use and high cost of a special purpose machine. Write today for Bulletin 675.

THE **Lodge & Shipley** COMPANY
MACHINE TOOL DIVISION • 3055 COLERAIN
CHOREMASTER DIVISION • 800 EVANS ST.
CINCINNATI 25, OHIO



STEEL

THE VEHICLE OF DEFENSE

Without steel there would be little or no movement of men and material . . . there would be little or no defense.

To meet the nation's growing defense needs, every steelmaker is expanding his facilities to produce more and more steel.

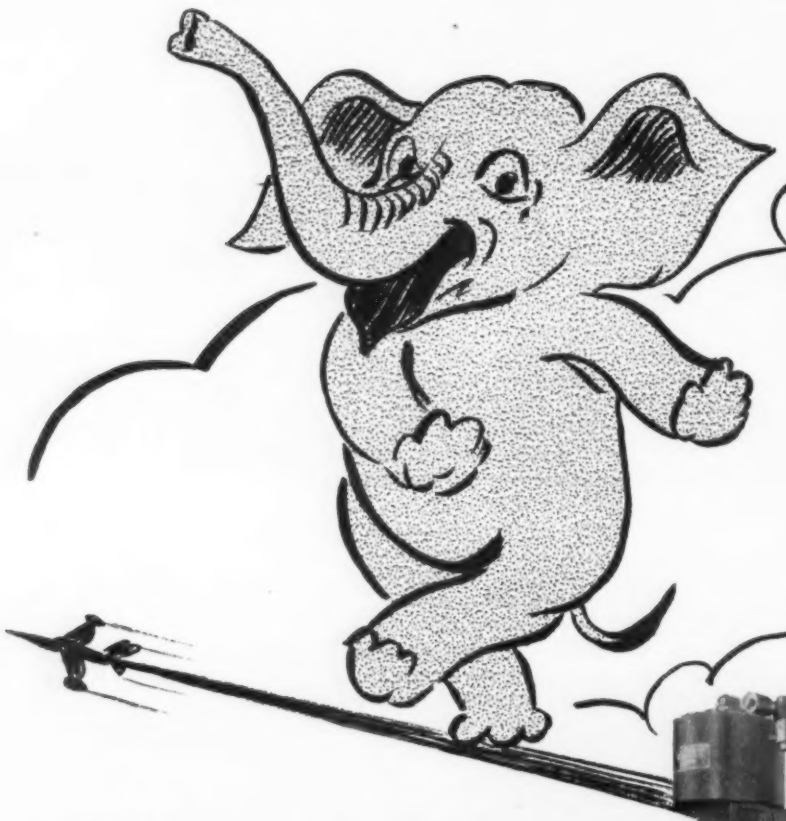
But to get more steel, America must first enlarge the shipping facilities that will be required to move vastly increased quantities of raw materials from mine to mill. More giant ships for the transport of iron ore—more sturdy river barges for the transport of coal—are urgently needed *now!*

Weirton Steel Company, pledged to participate in defense measures in any way and to any required degree, is supplying steel on approved allocation, to hasten the increase of America's inland fleet.

WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

NATIONAL STEEL CORPORATION



He knows how

HE'S DONE IT BEFORE

Sciaky Know-How in Resistance Welding of Aluminum to MIL-6860 and 6858 Specifications is Based on Past Performance, Too!

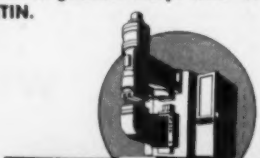
THE talented elephant is simply a means of calling to your attention *SCIAKY'S* experience in welding aluminum. Nearly all resistance welders being used today for welding to both MIL-6860 and MIL-6858 (formerly known as ANW-30 and 32) Air Force-Navy Specifications are *SCIAKY* machines. Sciaky leadership in aircraft welding and welding of non-ferrous and ferrous alloys is based on early pioneering and constant research in this specialized type of work.

Today, the new *SCIAKY* Series PMCO2ST Three-Phase Modu-Wave Welder offers new benefits to the aircraft industry and others welding aluminum, magnesium, brass, mild steel, monel, inconel, stainless, heat-resisting alloys and others. The new machine is quickly adjustable to handle them all! Quality of welds is unsurpassed and tip life is as much as 300% greater than with previous welders.

Sciaky guarantees to qualify the PMCO2ST Welder to MIL Specifications at the time of installation in your plant. For complete data on the welder that leads the field in meeting aircraft welding standards, write today.

NEW SERIES PMCO2ST

100 KVA at 50% duty cycle. 220 and 440 volt 3-phase 60 cycle standard. Available with special controls for 25 and 50 cycle current. Standard throat depths 36" and 54". Welding range to MIL specifications (two thicknesses): aluminum and magnesium alloys .025" to .081". SEND FOR NEW BULLETIN.



SCIAKY BROS. INC.

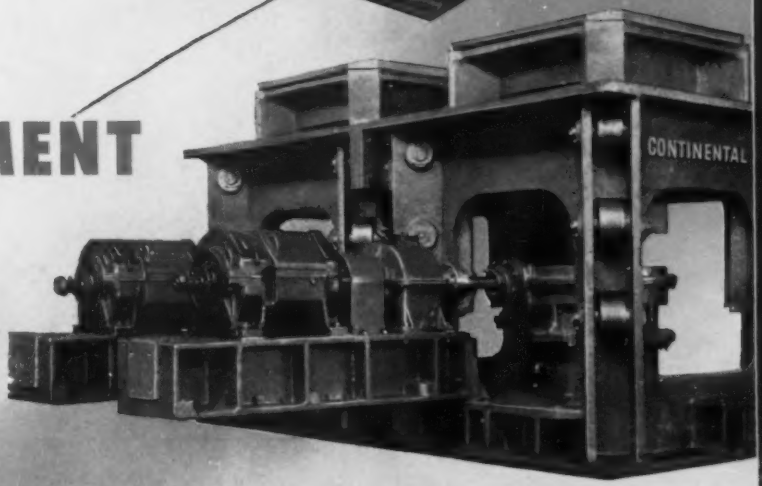
4923 W. 67th St. • Chicago 38, Ill.

SCIAKY

SAY "SEE-ACKY"

for AHEAD-OF-THE-FIELD engineering

REHEATING
FURNACE EQUIPMENT
by Continental

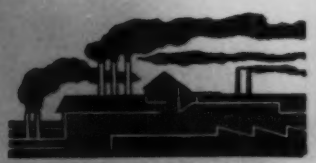


FURNACE RUN-IN TABLES
FURNACE RUN-OUT TABLES
FURNACE PUSHERS
FURNACE BUMPERS
FURNACE DEPILERS

Continental

check first with

Continental
FOUNDRY & MACHINE CO.
CHICAGO · PITTSBURGH
PLANTS AT:
EAST CHICAGO, IND.; WHEELING, W. VA.; PITTSBURGH, PA.



CASTINGS: Carbon and Alloy Steel from 20 to 230,000 Pounds.

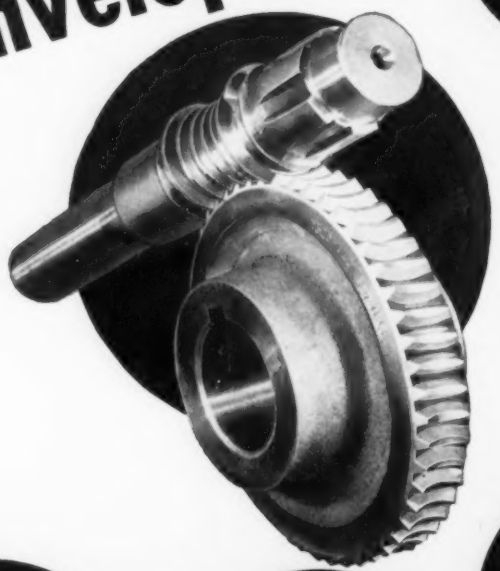
ROLLS: Iron, Alloy Iron and Steel; fo All Types of Rolling Mills.

MILLS: Complete Installations of Roll ing Mills and Auxiliary Equipment.

You get them all with Cone-Drive Double-Enveloping Gears—

LONGER LIFE ?

"HYDRAULIC" SMOOTHNESS ?



SMALLER GEARS ?

SIMPLER GEAR DESIGN ?

STRONGER GEARS ?

GREATER LOAD CARRYING CAPACITY ?

From the instant any two teeth of a Cone-Drive double-enveloping gear set come into engagement, they are engaged for their full depth and they stay that way—in full depth engagement—until they come out of engagement one-eighth of a revolution later.

To put it another way: ⅛ of all teeth in the gear of a Cone-Drive double-enveloping gear set are in continuous full depth engagement at all times.

This is possible because in Cone-Drive double-enveloping gears the teeth of the pinion are wrapped around the gear and the teeth of the gear are wrapped around (envelop) the pinion.(*)

This characteristic is what gives Cone-Drive Gears their high load capacity for a given size and weight, their quietness in operation, their "hydraulic" smoothness, their long trouble-free life.

(*) *Helical and spur gears are non-enveloping. Conventional worm gears are single-enveloping.*

CONE-DRIVE GEARS
DIVISION OF MICHIGAN TOOL CO.
7171 E. McNichols Rd.
Detroit 12, Mich.

Please send me without obligation further information on double-enveloping Cone-Drive Gears. We are particularly interested in the following:

Horsepower____to____

Ratio ____/1 to ____/1

Name _____

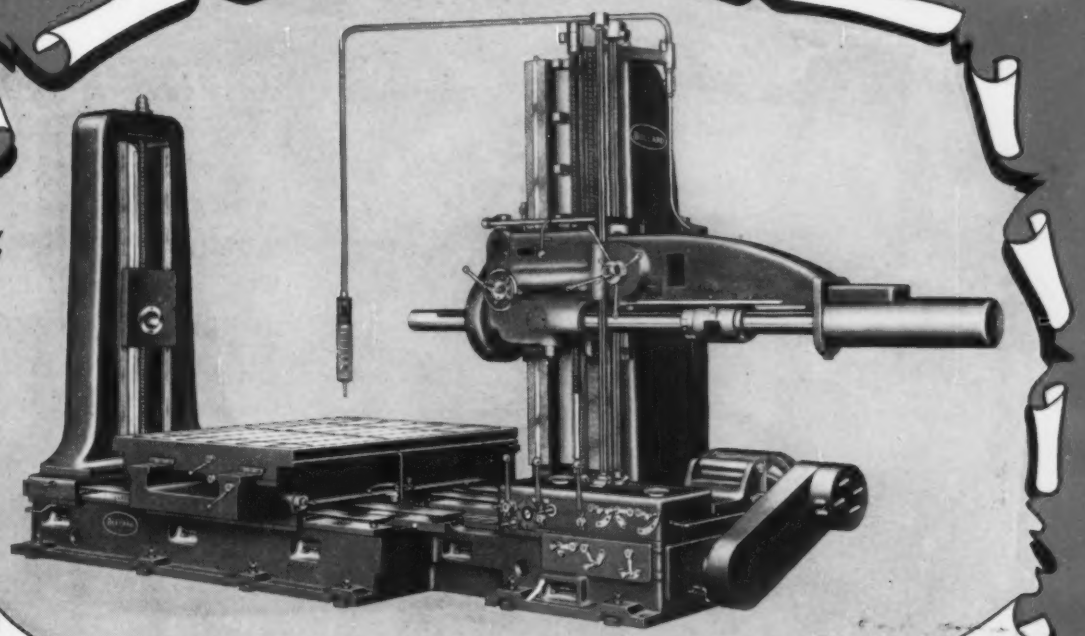
Title _____

Company _____

Address _____

CONE-DRIVE GEARS
Division, Michigan Tool Company
DOUBLE ENVELOPING GEAR SETS & SPEED REDUCERS
7171 E. McNichols Road • Detroit 12, Michigan

NOW — 4 WAY Bed Construction



BULLARD

HORIZONTAL BORING MACHINE

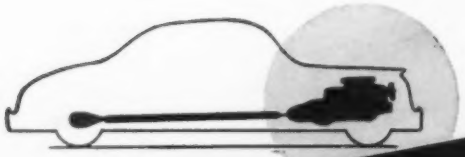
In addition to the Bullard 4-way bed construction, other design improvements such as protected bed-ways, non-metallic bearing surfaces under table and saddle, and adjustable nuts for table and saddle feed screws are a few of the improvements that place these 4" and 5" spindle machines on your list for investigation.

Furthermore, don't forget—convenient right hand operation, safety features and hydrodynamic drive.

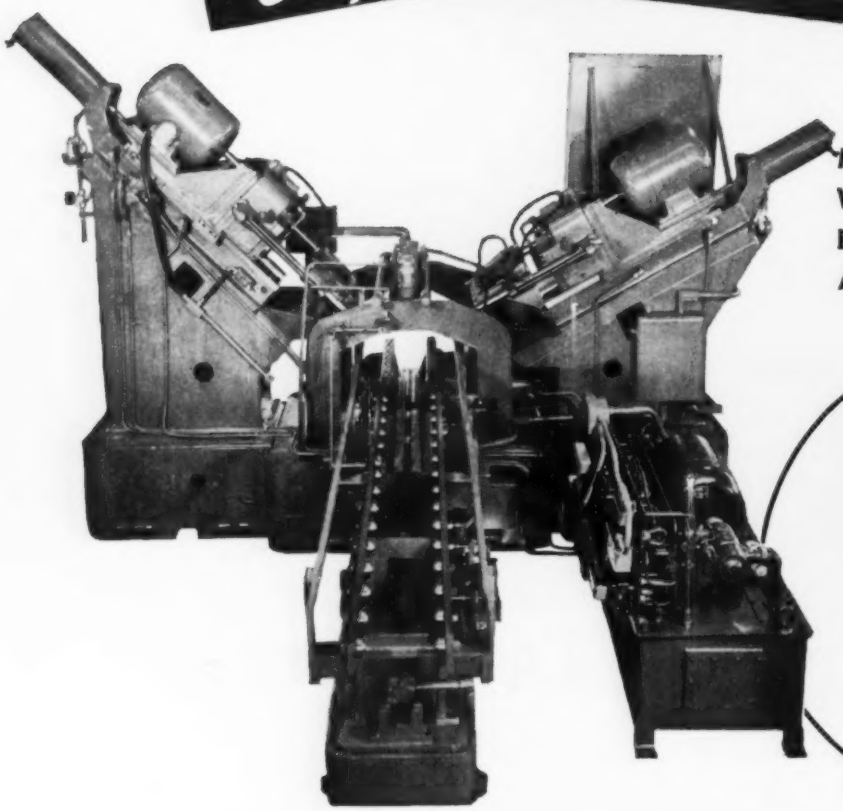
Write Bullard for other details

THE BULLARD COMPANY

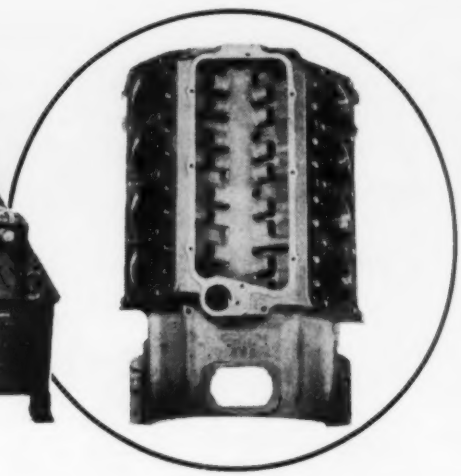
BRIDGEPORT 2, CONNECTICUT



Engine Production Problem "GETS THE BRUSH!"



MORRIS *Mor-Speed* MACHINE WIRE BRUSHES CYLINDER BORES and TAPPET HOLES AUTOMATICALLY . . . .



"Untouched by human hands," this massive V-8 engine block is automatically loaded, clamped, wire brushed on both banks, then automatically unloaded to the production conveyor.

Installed in the plant of a leading auto manufacturer, this Morris Production Machine speeds the production of a new super-powered engine. In the view shown here, the left hand hydraulically operated angular slide carries four wire brushes for the cylinder bores. The other angular slide carries eight brushes for the tappet holes. Automatic 180° indexing allows alternate brushing of both cylinder banks.

This Machine illustrates the versatility of Morris Engineers in applying production methods to time and labor consuming jobs. If your work requires numerous operations on a mass production basis, your inquiry is invited. No obligation.

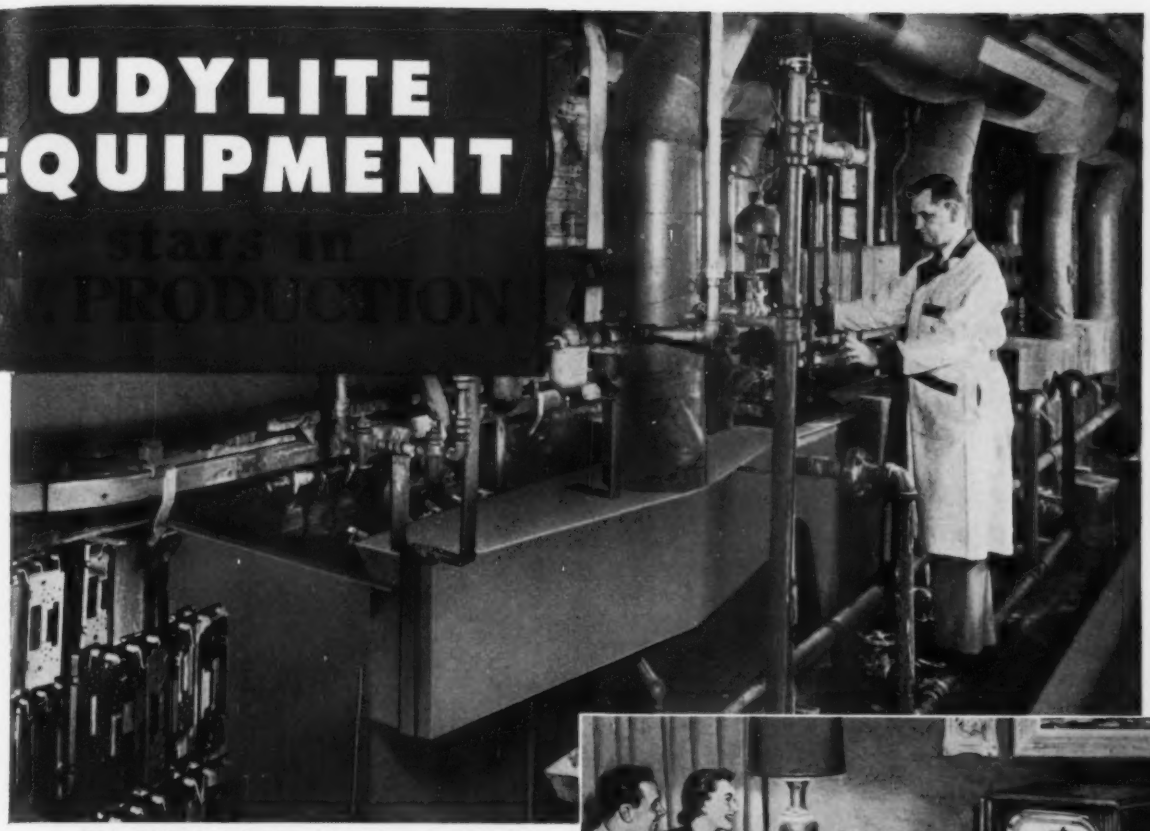
THE MORRIS MACHINE TOOL COMPANY

"A better product at less cost— with MORRIS ENGINEERED PRODUCTION"

Builders of MOR-SPEED Line

935 HARRIET STREET CINCINNATI 3, OHIO

UDYLITE EQUIPMENT stars in PRODUCTION



This Udylite Plating Machine is used for applying finish to television receiver components at the plant of Motorola, Inc.

Motorola, Inc., one of the nation's leading manufacturers of television receivers, chose Udylite equipment to speed production and reduce plating costs. Motorola uses a Udylite Full Automatic Plating Machine to apply a protective finish to many small parts—vital to the efficient performance of a television set.

Motorola's engineers are quick to point out the economy and efficiency offered by Udylite automatic plating equipment. Mr. Hank Mirrow, head of the plating department, says: "The Udylite Machine has been a great aid in processing and in conserving manpower in our plant. The machine has given us excellent service and has proved to be a necessity in our manufacturing operations."

You can receive these same benefits for your plant with Udylite methods and machines. Udylite offers a complete range of plating and metal finishing equipment for all plants—all products. Engineers are available for consultation with you—at your convenience—concerning your specific requirements. Call your nearby Udylite Technical Man today and let him give you the complete story of Udylite's facilities and services to better your plating operations. Or write The Udylite Corporation, Detroit 11, Michigan, for full details. There's no obligation.

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

PIONEER OF A BETTER WAY IN PLATING

Gear your product to... GRAY IRON'S ADVANTAGES

These helical gears illustrate several of Gray Iron's important advantages:

Wear Resistance... Gray Iron's strength and freedom from distortion, insure long life in metal-to-metal wear service.

Machinability . . . Gear teeth and other contact surfaces are easily machined to a high, mirror-like finish—reducing friction.

Lubricating Action . . . Gray Iron's graphite structure helps to protect against seizure or scoring of the part, even with failure of the lubricating system.

Readily Heat-treated . . . Gray Iron responds to flame hardening, induction hardening and other heat treatments. Wear resistance can be increased up to many times that of the as-cast material.

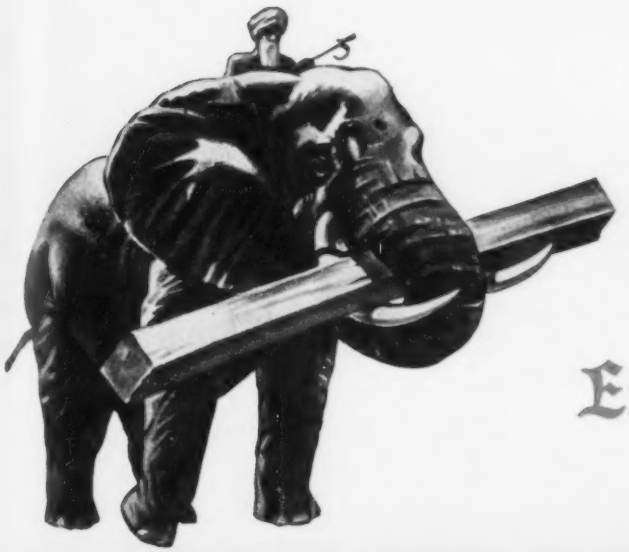
Why not gear *your* product to Gray Iron's unique combination of advantages? You'll find it pays.

- Castability
- Rigidity
- Low Notch Sensitivity
- Wear Resistance
- Heat Resistance
- Corrosion Resistance
- Durability
- Vibration Absorption
- Machinability
- Wide Strength Range

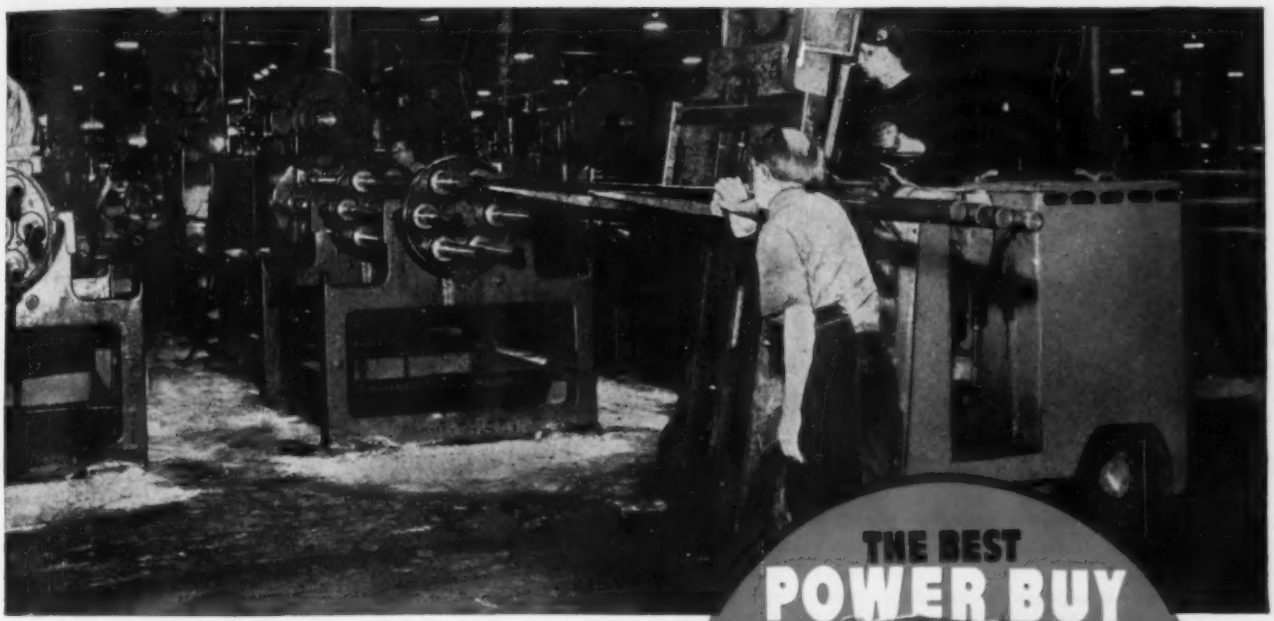
MAKE IT BETTER WITH GRAY IRON—Second largest industry in the Metal-working field

GRAY IRON FOUNDERS' SOCIETY, INC.

NATIONAL CITY-E. 6th BLDG., CLEVELAND 14, OHIO



IT COSTS $5.50 A DAY TO FEED AN ELEPHANT... ONLY 34 CENTS TO "FEED" AN Exide-Ironclad BATTERY



Thirty-four cents a day pays the full power cost of an Exide-Ironclad battery-powered industrial truck. Lifting, hauling and tiering all day long, it handles more tonnage than a herd of husky tuskers could move in equal time.

But low power cost is only part of the Exide story. In addition, Exide-Ironclad Batteries bring you these important benefits.

INSTANT SURGE OF POWER, plus finger-tip control, split-second handling, easy maneuvering, accurate spotting.
ROUND-THE-CLOCK PERFORMANCE—no mechanical troubles, no unscheduled down time.
UNIFORM SPEED straight through to end of shift.
LOW MAINTENANCE COSTS—seldom more than 15 cents per shift.
EXCEPTIONALLY LONG LIFE—proved on more than 100,000 heavy-duty jobs.
INHERENT SAFETY—freedom from the hazards of fire, fumes, noise and uncleanliness.

There are Exide-Ironclad Batteries for every size and make of battery electric truck.

Write for more facts and FREE copy of the new Exide-Ironclad Battery Motive-Power Catalog, Form 5161.

THE ELECTRIC STORAGE BATTERY COMPANY
Philadelphia 2
Exide Batteries of Canada, Limited, Toronto
"Exide" *Reg. Trade-mark U. S. Pat. Off.*

1888 . . . DEPENDABLE BATTERIES FOR 63 YEARS . . . 1951

Burned-out Motors Waste Manpower!

ELIMINATE ELECTRICAL INSULATION FAILURE WITH DOW CORNING SILICONES

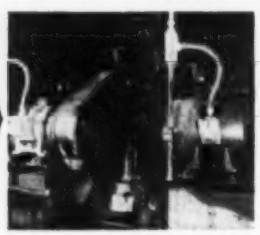
In many of the most efficiently operated plants in the country . . . across the nation in diesel-electric traction motors . . . in brake coils and pump motors along the water fronts . . . wherever electrical equipment works hard under tough operating conditions, Class H Insulation made with Dow Corning Silicones is being used to make motors, transformers and coils of all kinds last at least 10 times as long as they ever did before.

Here's an indication of what that means in maintenance costs alone: a division of Eaton Manufacturing Co. saved a potential $10,000 a year on $1200 invested in Silicone Insulation for 4 machine tool motors; a steel mill saved $3634 in maintenance on one crane hoist motor rewound with Silicone Insulation at a cost of $74; at a cost of $7,425, The Dow Chemical Company increased pumping capacity 50% and saved $17,415 on 20 Silicone insulated motors.

And the largest savings of all—wasted man-hours and lost production can't even be measured!

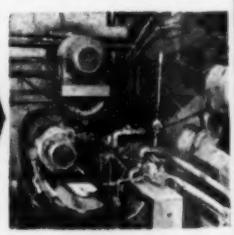
Dow Corning Silicones Mean Business!

In Critical Motors which determine your productive capacity . . .



In Overloaded Motors whether the load is intermittent or sustained to meet increased production schedules . . .

In Motors Exposed to High Ambient Temperatures or Excessive Moisture Specify Dow Corning Silicone Insulation.



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SAVE MANPOWER!
MAIL THIS COUPON TODAY

DOW CORNING CORPORATION, MIDLAND, MICHIGAN
Please send me technical data and a list of rewind shops experienced in the use of Dow Corning Silicone (Class H) Insulation O-3

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Company_____

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FIRST IN SILICONES

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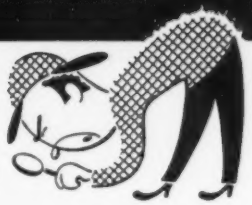

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"Metalam" and "Benbar"*
Government approved for:

JAN-P-117, Types I and II
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AN-B-20, Type II
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EXCLUDE RUST FROM THE PICTURE!

Bolts, screws, nuts, washers, cotter pins, and screw machine products made of

BRASS OR BRONZE

withstand rust and corroding influences longest. They are not merely "rust-proofed" — but are machined from enduring metals of non-ferrous composition.

Specify JAQUES-made Brass or Bronze fasteners and eliminate rust.

A full line of IN-STOCK standard sizes and threads in Brass and Bronze listed in our catalog — or special products from special alloys made-to-order quickly.

Write for our catalog—or send sample, sketch, or blueprint for immediate quotation.

The JAQUES Company

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Small things are highly important in relation to America's industrial might.

For that reason, Public Service has always been interested in so-called "small business".

We like nothing better than helping small business in any and all industrial problems involving power, fuel and light.

The Industrial Representatives of Public Service can help to find space for lease, or buildings and industrial sites for sale.

Consider New Jersey for your plant location or expansion. You'll find great markets . . . skilled people . . . top-flight transportation . . . outstanding research facilities . . . plus many other advantages *at the Crossroads of the East.*

FOR YOU . . . *send for your copy of the digested brochure about New Jersey, "The Crossroads of the East". Write Box C, Public Service, 70 Park Place, Newark 1, New Jersey.*

Consider New Jersey
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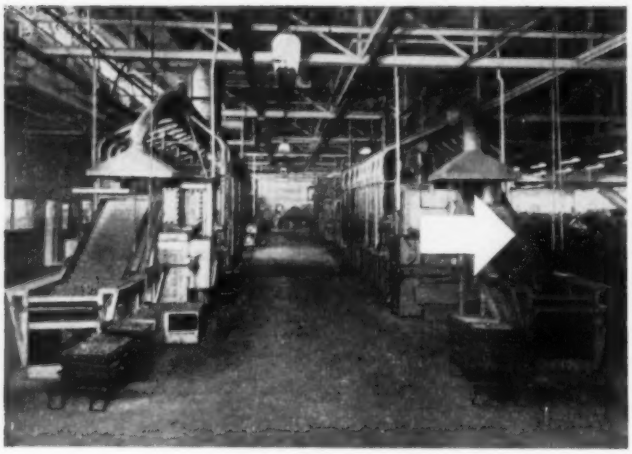
Did You Identify this Picture on Page 31?



It's a conveyor carrying cold forged parts into one of Allied Products Corporation's hardening and drawing furnaces. "Close-ups" of the efficient heat-treating methods employed by Allied, and the up-to-the-minute equipment in use, bring further detail to the complete Allied picture — one that has as its focal point the production of consistently good products.

Metal Stamping Facilities by

LANSING

At Your Service For

LAWNMOWERS · HOUSEHOLD APPLIANCES · TRANSPORTATION EQUIP. INDUSTRIAL EQUIP. · FARM IMPLEMENTS

LANSING STAMPING CO.

OVER 30 YEARS EXPERIENCE

LANSING 2, MICHIGAN

Now!

Prep-pik-I

(Phosphoric Acid Pickling Process)

used in conjunction with Permutit Q Process is . . .

Competitive, COST-WISE
Superior, PAINT-WISE
OVER SULPHURIC ACID PICKLING

Consider these Advantages:

- Simultaneous Pickling and Phosphatizing in one bath!
- No Plant Corrosion troubles!
- Less Floor Space!
- Continuous Regeneration!
- Applicable to Defense Contract Work!

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You SAVE TIME & MONEY by using AMB BRONZE CASTINGS

. . . **because** (1) *Good sound castings* mean *minimum rejects*, and the saving of time and money *wasted in useless finishing and assembly work.*

(2) *Real accuracy*, means closeness to *designs and specifications;* therefore, *less machinery and finishing costs.*

(3) *Quick and courteous Service* means *less follow-up time and annoyance* on customers' part — and of course, *more prompt deliveries* to our customers' customers.

Proof of AMB Quality and Service may be readily obtained from our customers.

Note: Our new, flat opening, flexible-bound "Reference Book on Bronze Casting Alloys" has just come off the press—copy will be sent upon request on your Business Letterhead.

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Established 1909

CONSIDER GOOD USED EQUIPMENT FIRST

AIR COMPRESSORS
400 cu. ft Worthington 14"x13" Motor Dr. With 100 H.P. Westinghouse A.C. Motor
1042 cu. ft. Ingersoll Rand XCB2 20"x12"x16", With 200 H.P. Synch. Motor 440/3/60, 100# Pressure

ANGLE BENDING ROLL
#0A Buffalo Angle Bending Roll, Motor Driven. Capacity 1½x1½x3/16" Angles

BENDERS—PIPE
Series 100 Pines Bending Machine, Capacity 1" O.D. 16 Gauge Tubing
No. 500 Wallace Bending Machine, Capacity 1¾"
100 ton Baldwin Southwark Hydraulic Pipe Bender, Comp. with Elecl. Equip. Discs for bending pipe 2½" to 8" incl.
No. 848 Size DS Parker Tube Bender, Capacity ⅛" to 3" O.D.

BENDING ROLLS
8'x⅛" Pyramid Type Plate Bending Roll, Motor Driven
13'x¾" Cleveland Pyramid Type, Motor Driven
18'x¾" H & J Pyramid Type, Motor Driven
20'x¾" Southwark Pyramid Type, Motor Driven

BOLT THREADING MACHINE
1" Landis Single Head Bolt Threading Machine, Belted Motor Drive, Equipt with Lead Screw

BOLT TRIMMER
Waterbury Farrel #3 Bolt Head Trimmer, Capacity 1"

CRANES—OVERHEAD ELECTRIC TRAVELING

3½ ton Shaw-Box 43'	Span 230 Volt DC.
5 ton Northern	26' Span 230 Volt DC.
5 ton Robbins Myers	28'6" Span 220/3/60
5 ton Shepard-Niles	37'3" Span 230 Volt DC.
5 ton P & H	55' Span 230 Volt DC.
5 ton P & H	48'7" Span 230 Volt DC.
10 ton Northern	55'8" Span 230 Volt DC.
10 ton Whiting	75' Span 230 Volt DC.
With 3 ton Auxiliary Hoist	
12 ton P & H	28'6" Span 110 Volt DC.
15 ton Niles	60' Span 230 Volt DC.
30 ton Morgan	27'6" Span 230 Volt DC.
30 ton Niles	60' Span 230 Volt DC.
With 5 ton Auxiliary Hoist	

CRANE—GANTRY
Model 280 Colby Electric Powered Whirley Crane. Complete with elecl. equip. 440/3/60. Capacity 45 Ton @ 30' Radius to 10 Ton @ 89' Radius

DRAW BENCH
240 ton Clearing Machine Co., Hydraulic Draw Bench Two Column Type with Double Action Piston, Stroke of Slide 200"

DRILLING & TAPPING MACHINE
Kingsbury Automatic Drilling & Tapping Machine 7-Station, 12-Head Six Vertical & Six Horizontal

EYE BENDER
William White, Capacity 1½" Round stock bent hot, ⅞" Round stock bent cold

FORGING MACHINES
1¼" Pawtucket
1½", 2", 2½", 3", 3½", 4", 5" Ajax
1½", 2" National
2", 5" Acme

FOUNDRY EQUIPMENT
#232-38 Osborn Jolt Squeeze Rollover Power Draw Molding Machine
Model BM53610 American Multi-Tumblast, With 10 Ft Main Table and four 4 Ft. Auxiliary Tables
48"x72" W W Sly Tumbling Barrel, Motor Driven
Model No. 6 Standard 66" Diameter Shell Cupola Complete with Blower & Foxboro Air Weight Control

FURNACES—ANNEALING
230 KW Electric Bell Cylindrical Vertical Type, Handles Coils 52" O.D. x 30" I.D.
Bell Radiant Tube Rectangular Annealing Furnace, Will accommodate eight stacks of coils. Suitable for annealing at temps. to 1350 F.
Surface Combustion Radiant Tube Annealing Furnace. For bright annealing copper tubing. Hearth-heating zone 30' long 3' wide

FURNACES—MELTING
2 Ton Heroult Nose Tilt Type Melting Furnace
3 Ton Heroult Rocker Tilt Type Melting Furnace
6 ton Heroult Tilt Type Melting Furnace, With 2000 KVA Westghse Transformer 11,000/3/60
10 ton Moore "Lectromelt Furnace, With 4000 KVA Westinghouse Transformer, 660-350 Volt 3 Phase 60 Cycle

GEAR REDUCERS
800 H.P. Falk Single Herringbone Reducer Ratio 9:15-1
1200 H.P. Mesta Double Reduction Gear, Ratio 20.52:1
600 H.P. Westinghouse Reduction Unit Ratio 3:76-1
500 H.P. Mesta Double Reduction Ratio 14:1
400 H.P. Falk Single Herringbone Gear Reducer 360/40 RPM

GRINDER—SURFACE
14"x36" Pratt & Whitney Vertical Surface Grinder Motor Driven, New 1942

HAMMERS—BOARD DROP
1200, 1500, 1600, 2000, 2500 lb. Chambersburg
1000, 1200, 1600 lb. Billings & Spencer
1200, 2000 lb. Erie

HAMMERS—STEAM DROP
35,000 lb. Chambersburg
1500, 2000 lb. Erie

HAMMERS—STEAM FORGING
1100, 1200, 1500, 2000, 3300, 4000, 6000 lb. Chambersburg
1000, 1500, 2000, 2500, 4000 lb. N.B.P
1100, 12,000 lb. Erie

HAMMERS—MISCELLANEOUS
No. 2B Nazel Hammer, Motor Driven
500 lb. Beaudry Hammer, Motor driven
1000# Chambersburg Pneumatic Motor Driven Forging Hammer. Complete with Motor
30"x24" Chambersburg "CECOstamp" Hammer

LATHE
36" x 17' Bridgeford Geared Head Lathe Quick Change Gears, Motor Driven

LEVELER—ROLLER
72" Aetna Standard Roller Leveler, Motor Driven 17 Rolls 2½" Diameter

MILLING MACHINE—PLANER TYPE
56'x30"x18' Ingersoll Slab Milling Machine, Adjustable Rail, Equipped with Trabohn Coolant Pump and 75 H.P. G.E. A.C. Induction Motor & Starter

MOTOR GENERATOR SETS
500 KW Crocker Wheeler Generator 250 Volt, Direct Connected to 750 KVA Crocker Wheel Syn. Motor 2200 volt 3 phase 60 cycle. With Control Panel
1000 KW Westinghouse Generator 250 Volt D.C. with 1440 H.P. Westinghouse Synchronous Motor 2300 volt 25 cycle 3 phase
1800 KW General Electric Generator 250 Volt D.C. With 2500 H.P. G.E. Motor 2300/3/60

NAIL MAKING MACHINES
No. 2 Glader Sizes 6D, 7D, 8D, 9D
No. 1½ National Nail Sizes 10D, 12D, 16D, 20D, 30D Angle Nail Sizes 10D, 12D, 16D, Roofing

PIPE MACHINES
No. 304 Oster Pipe Threading & Cutting Machine Capacity 1" to 4" LATE
No. 8 Oster "Rapiduction" Pipe Cutting Machine Capacity 2½" to 8" LATE
Eaton-Cole & Burnham Pipe Threading & Cutting Machine, Capacity 6" to 12"

PLANERS
32x35"x10' Niles One Rail Head
48x48"x16' Niles, Four Head
84x72"x53' Niles-Bement-Pond, Four Head
120"x120"x48' Pond, Four Head, Motor Driven
16x14x36' Mesta, Four Head

PLANERS—OPEN SIDE
42x42"x10' Cleveland, Three Head
48x60"x22' Cleveland, Three Head
60x60"x16' Detrick & Harvey, Three Head

WE OFFER A COMPLETE LIQUIDATION SERVICE ON ANY BASIS WHICH CIRCUMSTANCES INDICATE WOULD BE MOST BENEFICIAL, WHETHER BY AUCTION, PRIVATE LIQUIDATION OR OUTRIGHT SALE

CONSULTANTS IN MANUFACTURING PROBLEMS FOR OVER A QUARTER OF A CENTURY

THERE IS NO SUBSTITUTE FOR EXPERIENCE

CONTACT US IN CONFIDENCE WITHOUT COST OR OBLIGATION

PRESS—EMBOSSING & COINING
Bliss #26-A 800 ton Double Geared Knuckle Joint Press. With 8 Station Dial Feed

PRESSES—HYDRAULIC
35-75 ton Bliss Hydro-Dynamic Double Action Press. Stroke of Blankholder 16", Stroke of Main Slide 28". Available area of blankholder 30" x 27"
200 ton Elmes Hydraulic Press, Self-Contained 10" Stroke, 33" Distance Between Columns
300 ton Erie Steam Platen Press, 22" Stroke Bed Area 30" x 60"
325 ton Baldwin Southwark Hydraulic Briquetting Press, 24" Stroke, Size of Briquette 6" x 4"
500 ton Southwark Open Throat Hydraulic Press, 12" Stroke, Platen 56" x 56"
1000 ton Chambersburg 4-Column Hydraulic Press, 18" Stroke, Bed Area 48" x 48"
1000 ton United Steam Hydraulic Forging Press Davey Pat. Quick Acting. Distance between columns 7' x 2'9". Stroke of Ram 48"

PRESS—HYDRAULIC WHEEL
100 ton Caldwell Hydr. Wheel Press, 36" Between Parallel bars

PRESSES—STRAIGHT SIDE
No. 74½ Bliss Back Geared Press, 4" Stroke, 22" Between Uprights
No. 620 Bliss High Production Press Flywheel Type 1¼" Stroke, Face of Slide 8" x 16½"

PRESSES—TOGGLE DRAWING
No. 68 Toledo Geared, 7" Stroke of Punch slide, 3½" Stroke of Blankholder slide, 30" Between Uprights
No. 14B Bliss Toggle Drawing Press, 53" Between Uprights, 24" Stroke of Blankholder, 28" Stroke of Plunger

PRESSES—TRIMMING
No 3 Erie Flywheel Drive Trimming Press, 3¾" Stroke, 13" Between Guides
100 ton Chambersburg Hydraulic Trimming Press 18" Stroke, 36" Between Uprights.

PUNCH—BEAM
Long & Allstatter Double End Beam Punch. Capacity Beam Punch End—Punch flanges and web 24" I-beam and smaller

PUNCH & SHEAR COMBINATIONS
#91 Size 16 Hercules Universal Ironworker. Capacity Punch 1-1/16" x ⅝", Shear Plate 8", Flat 6¼" x ⅝", Angle 6 x 6 x ⅝", Round 1⅞", Square 1⅝"
No 4½ Hilles & Jones Single End Punch, 60" Throat Capacity 1¼" thru 1", Architectural Jaw
No. 4 Hilles & Jones Single End Punch, 48" Throat Capacity Punch 1¼" thru 1"
No. 5 Hilles & Jones Single End Punch, 48" Throat Capacity Punch 2" thru 1¼"
Long & Allstatter Single End Punch, 60" Throat Capacity Punch 1⅝" thru 1"
No. 2½ Buffalo Universal Ironworker, Motor Dr. Built-in Notcher and Coper LATEST

RECOILER
Steel Equip Co. Recoiler, Adjustable for strips .40" to 1.0" wide, Winds coils up to 36" O.D.

RIVETERS
50 ton Hanna Pneumatic Yoke Riveter, 102" Throat, 21" Gap
125 ton Hanna Bull Riveter, 75" Reach, 24" Gap
150 ton Chambersburg Hydraulic Gap Riveter

ROLL—CORRUGATING
Stamco Corrugating Roll, Designed for 1¼", Corrugations 48" Wide, 28 Gauge Capacity

ROLLING MILLS
9 x 20" Schmitz Single Stand Two High
18 x 36" Birmingham Single Stand Two High
20" x 60" Mackintosh Hemphill 3-Hi Breakdown Mill
22" x 40" Continuous Single Stand Two High
24" x 52" Single Stand Two High Roughing Mill
27" x 84" Mesta Two High Hot Rolling Mill

ROLLS—PLATE STRAIGHTENING
72" Bertsch No. 12 Plate Straightening Roll, Motor Driven. Seven 11½" Dia. Rolls, Capacity ⅝" Plate
72" McKay Plate Straightening Roll. 11 Rolls 12" Diameter
110" x ½" Niles Plate Straightening Roll

SAWS
26½" Kling Down Stroke Friction Saw, Motor Driven. Hydraulic Feed. Complete with Pump & Motors

SHEARS—ALLIGATOR
No. 1½ Doelger & Kirsten High Knife Right Hand Alligator Shear, Motor Drive. Capacity 2" Rounds.
No. 7 Carlin Left Hand Low Knife Alligator Shear Motor Driven. Capacity 3" Square

SHEARS—ANGLE
Long & Allstatter Double Angle Shear, Model B. Complete with Elecl. Equip.

SHEARS—BAR
No. 2 LH Lewis Open End Bar Shear, Motor Drive. Capacity 1¼" Round
No 8 Mesta Vertical Cold Bar Shear, Max. Capacity 6", O.D., Complete with Elecl. Equip.

SHEARS—ROTARY
No. 60 Quickwork Rotary Shear, ⅝" Capacity
No. 100 Kling Rotary Shear, 1" Capacity

SLITTER
72" Yoder Gang Slitter, Capacity 5 Cuts 20 Ga.

STRAIGHTENERS
18" Hallden Straightening & Cut-Off Machine 9 Roll Leveler with 3¼" x 20" Rolls, Motor Driven. Capacity .005 gauge x any width in 125 gauge x 18" width
No. 1 Sutton, Capacity up to 1½" Diameter
No. 2 Sutton, Capacity up to 3½" Diameter
No 6 Kane & Roach Shape Straightener, Belt Dr. Capacity 5x5x⅝" Angles, 2⅜" Rd. & Sq.
Kane & Roach Rotary Straightening Roll, Capacity ⅜" to ¾" Dia.

SWAGING MACHINES
No. 00 Torrington, Capacity 5/16"
No. 3A Standard, Capacity ⅝" Solid 1¾" Tube
No. H4 Langelier, Capacity 1⅛" Tubing
No. H5 Langelier, Capacity 3" Tubing

TANK
25,000 Gal. Water Tank 15' Diameter, With supporting tower and piping

TESTING MACHINES
10,000# Southwark Model S-10-B Hydr. Universal M.D
20,000# Southwark Model S10C Universal, Motor Dr.
300,000# Southwark Emery Universal Hydraulic
400,000# Amsler Hydraulic Compression Testing Machine

TRANSFORMERS
1000 KVA Westinghouse 3 ph. 60 cy. 13,200 volts primary, 230 secondary
1500 KVA Pennsylvania 3 ph. 60 cy. 13,200 volts primary, 230 secondary
2000 KVA Pennsylvania 3 ph. 60 cy. 13,200 volts primary, 230-105 secondary
30000 KVA Westinghouse 3 ph. 60 cy. 13,200 volts primary, 230 secondary
7500 KVA General Electric 33,000 to 13,800 volts, 3 phase, 60 cycle

WELDERS
150 KVA Federal P2-12A Press Type Spot Welder 440 volt single phase 60 cycle
200 KVA Progressive Circular Seam Welder, 440 volt 60 cycle Welding Timer & Idler Knurl Drive
Taylor Winfield Press Type Spot Welder, Type HWRD-36-3 HI-WAVE
700 KVA Federal Flash Welder, Enclosed Rim Type Ring Size 6" to 35" Dia. x 12" Wide, 440 Volt Single Phase

WIRE MACHINERY
No. 22 U. S. Multi-Slide, Motor Driven, Max. Length of Stock Feed 4½"
20 Draft Superior Wire Drawing Machine, Capacity Wire 18 Ga. to .011" Motor Dr. Spooling Attachment. Wire Pointer, Wire Puller incl. NEW 1946

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BORING MILL. 84" Gisholt vertical
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GRINDER. No. 16CP16 & 24-36 Bryant
GRINDER. Nos. 228 & 230 Hanchett opposed disc
GRINDER. 12", 16" & 24" Heald rotary
GRINDER. Nos. 10, 16 & 16A2 Blanchard
HAMMER. No. 5M Nazel pneumatic
HONER. No. H1 Micromatic Hydrohoner
KEYSEATER. Nos. 4 & 5 Mitts & Merrill
LAPPER. No. 26F Norton
LATHE. 14"x6', 18"x6' & 20"x8' L. & S
LATHE. 25"x48" & 40"x88" Lebland
LATHE. 26"x10' ctrs. Wickes
LATHE. 36"x16' Bridgeford
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LATHE, TURRET. Nos. 3 & 3AL Gisholt
LATHE, TURRET. 24" Bullard vertical
LATHE, TURRET. No. 5 Foster
LATHE, TURRET. 1½" Oster
MILLER, VERTICAL. No. 3 Kempsmith
MILLER, VERT. No. 3 & 4 Cincinnati
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GEAR PLANER, 11" Reinecker, Bevel, A.C. M.D.
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GEAR SHAPER, No. 61A Fellows, 1943
GEAR SHAPER, No. 64 Fellows, 1944
GEAR SHAPER, No. 64A Fellows, Late
GEAR SHAPER, No. 6 Fellows
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GRINDER, 16" x 48" Cinci.
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GRINDER, #16Y28 Bryant Int. 1943
GRINDER, No. 174 Heald, gap, Int., 54" Swing, 1942
GRINDER, No. 72A5 Heald, 1943
GRINDER, No. 13 B & S, Univ. M.D.
GRINDER, No. 75A Heald, Internal, Hand
GRINDER, No. 6-T Sellers Tool, '42
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Heald 72A3 Int. Centerless Sizematic, #1 Tool
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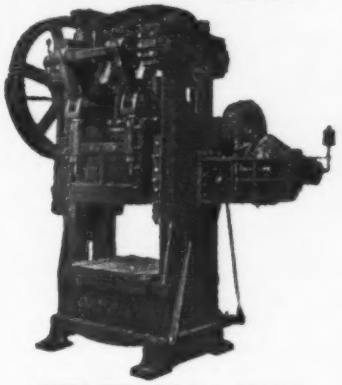

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7¾" Cleveland Model A, m.d.

HORIZONTAL BORING MILLS
3½" bar Landis Floor Type, m.d.
4" bar Detrick & Harvey Floor Type, m.d.
5" bar Barrett, m.d.
3½" bar Niles, m.d.
10" bar Sellers Floor Type, m.d.

VERTICAL BORING MILLS
24" Bullard New Era, m.d., with side head
42" Colburn, m.d., 1 swivel head, 1 turret head, p.r.t.
42" King, belted m.d., 2 swivel heads, p.r.t.
48" Putnam H.D., m.d., 2 swivel heads
54" Colburn, m.d., 1 turret head, 1 swivel head
100" Niles Heavy, m.d., p.r.t.
100" Niles Extra Heavy Pattern, m.d., p.r.t.

BROACHING MACHINES
75 H.P. LaPointe Hydraulic, m.d.
Cincinnati Mill Breach, m.d., 10" spindles, new

MULTIPLE SPINDLE DRILLS
No. 3 Baush, m.d., 16x30" head, 15 spindles
No. 3 Baush, m.d., 20x40" head, 15 spindles
No. 10 Foote-Burt Fixed Center, m.d.
3 spindle 24" Barnes All Geared Self-Oiling, m.d.
3 spindle 12" Rockford Gang, m.d.
4 spindle Foote-Burt Rail, No. 4 Taper, m.d.
4 spindle Niles-Bement-Pond H.D. Rail, m.d., 12' rail, No. 5 Taper

BALL BEARING DRILLS
Model D 1100B Walker-Turner Bench Type, 20" size, brand new
No. ½, 1, 2 Avey, belted m.d.
No. 1B Edlund, m.d., new
No. 2—12" Foote-Burt Single Spindle, m.d.
No. 3 Type MA6 Avey, m.d., 12" overhang, latest
No. 4 Fosdick, 8" overhang, belted m.d., No. 2 Taper
No. 5M—16" Fosdick, m.d.
1 spindle No. 3 Avey Type B, style MA6, m.d., No. 3 Taper, latest
2 spindle Allen, belted m.d., 8" overhang
2 spindle Avey, size No. 1, Type B, style VHP, m.d., 8" overhang
2 spindle No. 3 Avey, belted m.d., p.t.
2 spindle No. 4BM Fosdick High Speed, m.d., 12" overhang, No. 2 Taper
3 spindle No. ½ Avey Heavy, direct m.d., latest
4 spindle No. 3 Avey, belted m.d., No. 3 Taper, 12" overhang
6 spindle No. ½ Avey, model MA8, m.d., latest
6 spindle Leland & Gifford, No. 2 Taper, m.d. on each spindle
6 spindle 2B Edlund, m.d., No. 2 Taper
6 spindle No. 3 Avey, belted m.d.
6 spindle Henry & Wright, m.d., 15" overhang, No. 2 Taper

HORIZONTAL DRILLS
Morris Horizontal Mor-Speed, m.d.
No. ½Bx30" Pratt & Whitney 2 spindle Deep Hole Reaming Machine, m.d.
No. ½Bx50" Pratt & Whitney Gun Barrel Rifling Machine, m.d., latest
No. 1Bx74" Pratt & Whitney 2 spindle Deep Hole Reaming Machine, m.d., latest
No. 1½x105" Pratt & Whitney 2 spindle Deep Hole Drill, m.d., latest
No. 1½x105" Pratt & Whitney 2 spindle Gun Barrel Rifling Machine, m.d.
No. 1 Pratt & Whitney 2 spindle Deep Hole Drill, belted m.d.
No. 1½ Pratt & Whitney 2 spindle, m.d., older type
Pratt & Whitney Rifling Machine, belt
5 spindle Detroit Semi-Automatic, belt
2 spindle No. 410 W. F. & John Barnes Deep Hole Drill, m.d.

TURRET LATHES AND SCREW MACHINES
No. 1 Cincinnati-Acme Semi-Universal, m.d., chucking, Timken
No. 1L Gisholt Universal, m.d., chucking, Timken
No. 2A Warner & Swasey Universal, m.d., chucking
No. 2 Pratt & Whitney Shaver, m.d.
No. 2B Foster Universal, m.d., chucking
No. 2F Foster Fastermatic, m.d., Timken
No. 2L Gisholt, m.d., chucking, standard and long bed types, Timken
No. 3 Cincinnati-Acme Full Universal, m.d., chucking
No. 3 Foster Geared Head, m.d., bar
No. 3B Foster Universal, m.d., bar
No. 3F Foster Fastermatic, m.d., Timken
No. 3L Gisholt, m.d., chucking, Timken
No. 3L Gisholt, with cross sliding turret
No. 3A Warner & Swasey Universal, m.d., chucking
No. 4R Cincinnati-Acme, m.d., bar
No. 4 Warner & Swasey Plain, cone, bar and chucking types
No. 4 Warner & Swasey Universal, m.d., chucking
No. 4A Warner & Swasey Universal, m.d., chucking
No. 4FU Foster Fastermatic, m.d., latest
No. 5.0 Acme Universal, m.d., designed for glass bottle work, latest
No. 5 Foster Universal Geared Head, m.d., chucking
No. 5 Gisholt Ram Type Universal, m.d., Timken, late
No. 7 Bardons & Oliver, cone
2½"x24", 3x36", 3½x32", 4x34" Jones & Lamson Geared Head, m.d., bar and chucking types
3¼" Cincinnati-Acme Geared Head Flat Turret, chucking and bar types
18" Libby Type A, m.d., chucking
20" Acme, s.p.d., bar
20" Acme, cone
28" Gisholt, cone
26" Libby Type C, m.d., chucking
#5 Woods Tilted Turret, Model D, cone

MISCELLANEOUS
Victor Nut Facing Machine, m.d., ¾" to 2" nuts
No. 4B Nazel Air Hammer, m.d., with compressor built-in
Model PHI Brinell Hardness Tester, m.d.
Cincinnati Four Spindle 360° Automatic Profiling Machine, m.d., automatic tracing attachment, latest
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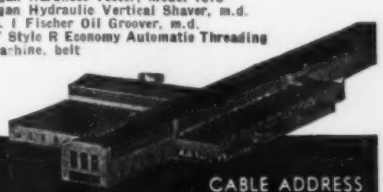
No. 1 Fischer Oil Groover, m.d.
¾" Style R Economy Automatic Threading Machine, belt



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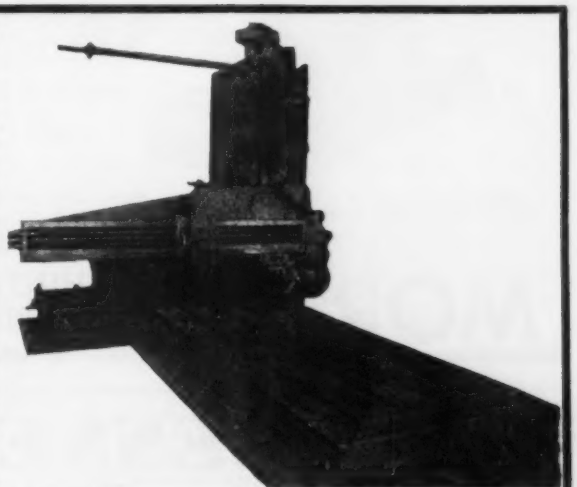

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This planer has never been moved and can be seen at its original location. For your convenience, a master mechanic will be on duty to answer all questions.

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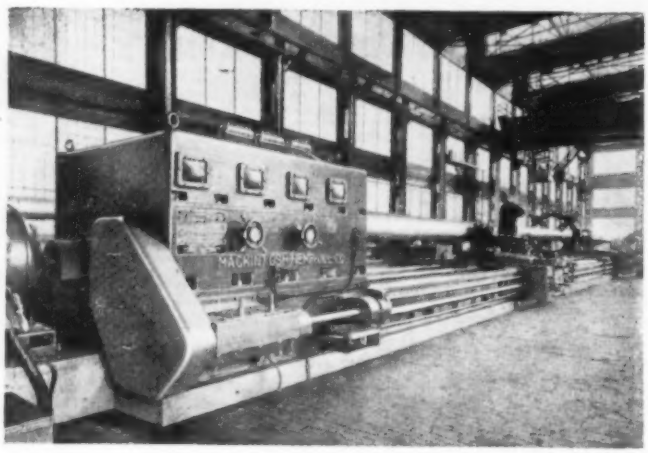

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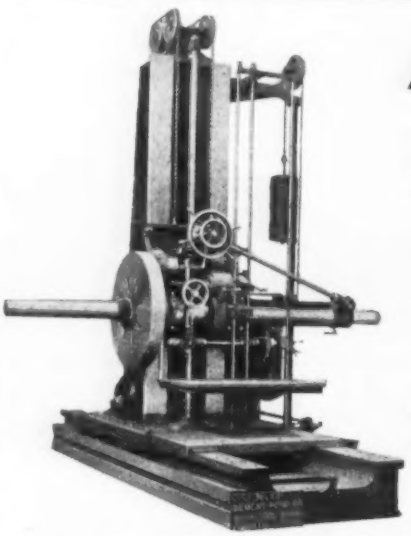

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Diameter of spindle	8"
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Vertical travel spindle on column—72"
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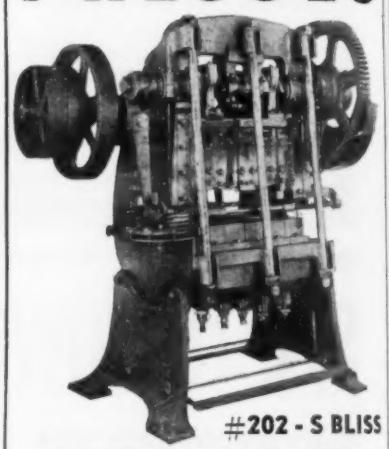

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Both are straight side, double crank, tie rod frame, with counter balanced ram, a'emite lube system, 2 hand controls, etc.

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U. S. 1000 Ton Four Posted Hobbing Press—hydraulic—8" stroke—complete with pump—width between posts 20"—dia. of ram 20"

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Steam Temperature	**Saturated**
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1—6 ton Huber 3W Diesel Roller
1—41B Bucyrus Steam Crawler Crane 65' Boom
1—45' Crane Boom for Link Belt LS90
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SQUIRREL CAGE MOTORS, 3-PH., 60-CY.

Qu.	H.P.	Make	Type	Volts	RPM
1	400	G.E.	IK	2300	514
1	400	G.E.	KT-412	2300	450
1	250	Whse.	CS	2200	1160
1	200	Al. Ch.	AR	220/440	580
2	125	Al. Ch.	AR	2200	1760
1	125	Whse.	CS-761	440	1750
2	125	C.W.		440	428
3	100	Whse.	CS-663	440	1750
1	100	Al. Ch.	AR-226	2200	1160
1	100	Al. Ch.	AR	550	690
1	100	F.M.	H-241B	440	450
1	100	Whse.	CS-938	2200	514
1	78	G.E.	1-15-K	220	570
2	75	Al. Ch.	AR	2200	1765
1	75	Whse.	CS	440	1750

CRANE AND MILL MOTORS 230-VDC

Qu.	H.P.	Make	Type	R.P.M.
1	150/200	Whse.	MCSA-181	450/400
1	150/200	Whse.	MCB-100	370/300
1	100/140	Whse.	MCB-90	500/415
2	100/140	G.E.	MDA-108	500/430
2	100	G.E.	CO-1831	675
1	75/100	Whse.	CK-10	675/500
4	65	G.E.	CO-1811	600
3	65	G.E.	CO-1830	700
2	54/60	C.W.	B.W.	575/480
4	50	G.E.	CO-1810	725
3	50	G.E.	CO-1830	525
1	50	G.E.	CO-2007	540
1	50/65	Whse.	K-10	675/625

Qu.	H.P.	Make	Type	R.P.M.
1	40/50	G.E.	MDB-105	550/475
1	37½	Whse.	MT-2	535
1	40/55	C.W.	EW	600/505
2	36/42	C.W.	DW	575/520
1	30/20	G.E.	MDB-104	575/725
3	20	Whse	K-7	560
2	25	G.E.	CO-1808	725
2	20	Whse.	K-6	515
1	20	G.E.	CO-1827	600
1	19	C.W.	BWS-15	560
2	16/19	C.W.	BW	625/560
12	15/19	Whse.	K-5	630/550
1	15	G.E.	CO-1825	1000
1	13/17	G.E.	MDA-103	800/700
1	11/13	C.W.	A2W	1050/910
3	10/13½	G.E.	MDA-404	800/700
3	10/13½	Whse.	MCSA-41	725/610
2	8/9½	C.W.	AW	695/635
5	7½	G.E.	CO-1824	750
3	7½	Whse.	MCSA-31	800/650
2	7/10	G.E.	MDA-102	1025/800
2	7½/10	C.W.	SWS-7½	800/675
6	6/7½	Whse.	MCA-20	700/600
2	5/6½	G.E.	MDA-402	1025/925
1	5/6½	C.W.	SWS-5	1050/925
1	4/5	G.E.	MDA-101	975/825
1	4/5	G.E.	MDB-101	975/825
1	3½	G.E.	CO-1803	750

SYNCHRONOUS MOTORS 3-Phase, 60 Cycle

Qu.	H.P.	Make	P.F.	Volts	R.P.M.
1	1500	Whse.	.8	2200	720
1	700	G.E.	.8	2300	720
1	400	Whse.	.8	440	600
1	268	Al. Ch.	1.	2200	900
1	150	G.E.	1.	2200	900
1	150	G.E.	.8	550	450
3	125	El. Mch.	1.	4800/2400	900
1	125	G.E.	.8	2200	900
3	100	Whse.	.8	440	1800
1	100	Whse.	1.	2200	1200
1	100	Ideal	.8	440	900

Qu.	H.P.	Make	P.F.	Volts	R.P.M.
2	100	G.E.	.8	440	600
1	60	G.E.	.8	440	1200
2	50	G.E.	.8	2200	600

MOTOR GENERATOR SETS

Qu.	K.W.	Make	RPM	Volts DC	Volts AC
1	2400 (3-U)	Al. Ch.	720	600	4800/2400
1	1500	Whse.	514	250	4600/2300
1	1500	Al. Ch.	720	600	2200
1	1500	Whse.	720	600	2200
2	1000	G.E.	514	575	4000/2300
1	750	Whse.	900	600	2300
1	700 (3-U)	G.E.	720	250	2300/440
1	500 (3-U)	Whse.	1200	120/240	4000/2300
1	500 (3-U)	Ideal	1200	120/240	4000/2300
1	500	C.W.	720	575	2300/440
2	500	C.W.	720	250/275	2300/440
1	200	Ridgway	900	275	2300
1	155	G.E.	720	250	2300/440
1	150	Al. Ch.	1200	250	2200/440
1	100	Ridgway	1200	275	4000/2300
1	75	Star	1200	230	440/220
1	75	Al. Ch.	900	250	2300
2	50	Burke	1800	240	440/220
1	45	Whse.	1200	125	440/220
1	30	Reliance	1800	250	440/220
2	25	Whse.	1200	120/240	440/220
1	20	Reliance	1800	250	440/220

3-U—3-unit set.
We can also furnish any of the above with exciters and VARIABLE VOLTAGE CONTROL engineered and rebuilt to suit your requirements.

TRANSFORMERS (Oil Cooled)

Qu.	K.V.A.	Make	Type	Phase	Voltage
1	7500	G.E.	H	3	23000/29700 13800/-12600
2	4500	G.E.	H.T.	3	27000/13500 2300
1	3750	Whse.	S	3	67000-14400/2400
3	500	G.E.	H	1	13200/11880 220/440
3	136	G.E.	H	1	19000/9500 550/2200
3	100	Whse.	Auto	1	2300/4160 1385/2400
3	100	Whse.	S.S.	1	12075/10955 230/460

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GUARANTEED
ELECTRIC POWER EQUIPMENT

D.C. MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
1	1750	Whse.		600	550/700
1	1500	Whse.		525	600
2	1000	Whse.		456	600
1	940	Whse.	QM	250	140/170
1	650	G. E.	MPC	250	115/145
1	600	Al. Ch.		250	400/800
1	500	Whse.		230	300/600
1	350	Cr. Wh.	CCM-151H	230	1100
1	335	Whse.	MQ	250	300/900
1	300/300	G. E.	MPC	230	360/920
1	275	Whse.	QM	230	415/850
1	250	G. E.	MPC	230	400/500
1	150	G. E.		600	250/750
1	150	Cr. Wh.	65H	230	1150
10	150	Cr. Wh.	83H-TEFC	230	900
1	150	G. E.	MPC	230	250/450
1	100	Rel.	1050T	230	400/1200
1	100	G. E.	CD-175	230	345/780
1	100/150	Whse.	SK-206	550	800
1	125	El. Dy.	308	230	750/1500
1	115	Cr. Wh.	JHL	230	1200
1	50/100	G. E.	MPC	230	225/450
3	100	Whse.	SK-184.5	230	475-950
1	100	G. E.	CDP-115	230	1750
2	92	Whse.	SK-173	230	575/1150
1	90	G. E.	CDM-1242-Z	115	1800
1	75	Whse.	SK-135	230	1750
1	75	Whse.	SK-180L	115	650
2	75	G. E.	CDM-1126-Y	230	2000
1	75	Cr. Wh.	CMC-65H	230	500/1500
1	60	El. Dy.	258	230	525/1050
1	60	Whse.	SK	230	500/1000
1	60	Whse.	SK-126	230	1600
1	50	Cr. Wh.	CCM	230	1750
1	50	El. Dy.	508	500	194/775
1	50	Cr. Wh.	CMC-80H	230	380/750
1	15/50	Cr. Wh.	CMC-81H	230	300/900
1	50	Whse.	SK 113	230	1750
2	50	G. E.	RCP-31B	230	1750
6	25/30	G. E.	CD-105	230	800/2070

MILL & CRANE

2	125	G. E.	CO-1832	230	625
2	60	Whse.	Hoist	230	415
2	50	Whse.	Hoist	230	415
4	50	Whse.	Hoist	230	400
2	30	G. E.	MD-104½AA	550	700

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Shaw—10 Ton, 67' Span, Cab 230-DC
Shaw—7½ Ton, 47' Span, Cab 230-DC
Shaw—7½ Ton, 37'10" Span, Cab 230-DC
Morgan—75 Ton, 10 Ton Aux., 49'6" Span, Cab 230-DC
P & H—8 Ton, 59'11" Span, Cab 230-DC
P & H—10 Ton 2-5 Ton Hooks, 72' Span, Cab 230-DC
Northern—25 Ton 60' Span, Cab 3-40-220-AC (New)
Toledo—10 Ton, 5 ton Aux., 50' Span, Cab 230-DC
Toledo—30 Ton, 50'4" Span, Cab 3-40-220-AC
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250' wide, 650' long, 39' to crane rail, total height 44'11", also 7 cranes
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12 ton Plymouth gas 36" ga.
12 ton Plymouth gas std. ga.
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50 ton all steel twin hoppers
40 ton double sheathed Box Cars
50 ton Flat Cars 40'6"
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New magnets also

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100 Curtis Air Hoists—4½' lift, 500# cap.
1 125 KVA Sciaky Spot Welder
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These capable of welding aluminum to Govt. specifications.
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NEW & RELAY RAILS
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Complete Set Slitter Knives, high carbon, high chrome, 5" arbor hole 10½" O.D. or less, various thicknesses.

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GOOD USED DIESEL
ELECTRICAL OR MECHANICAL
STANDARD GAUGE

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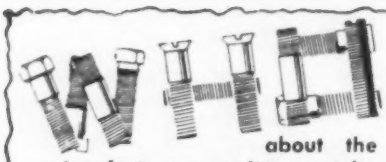

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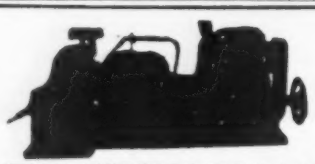

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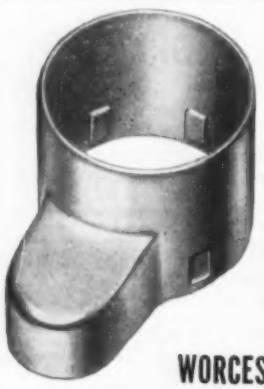

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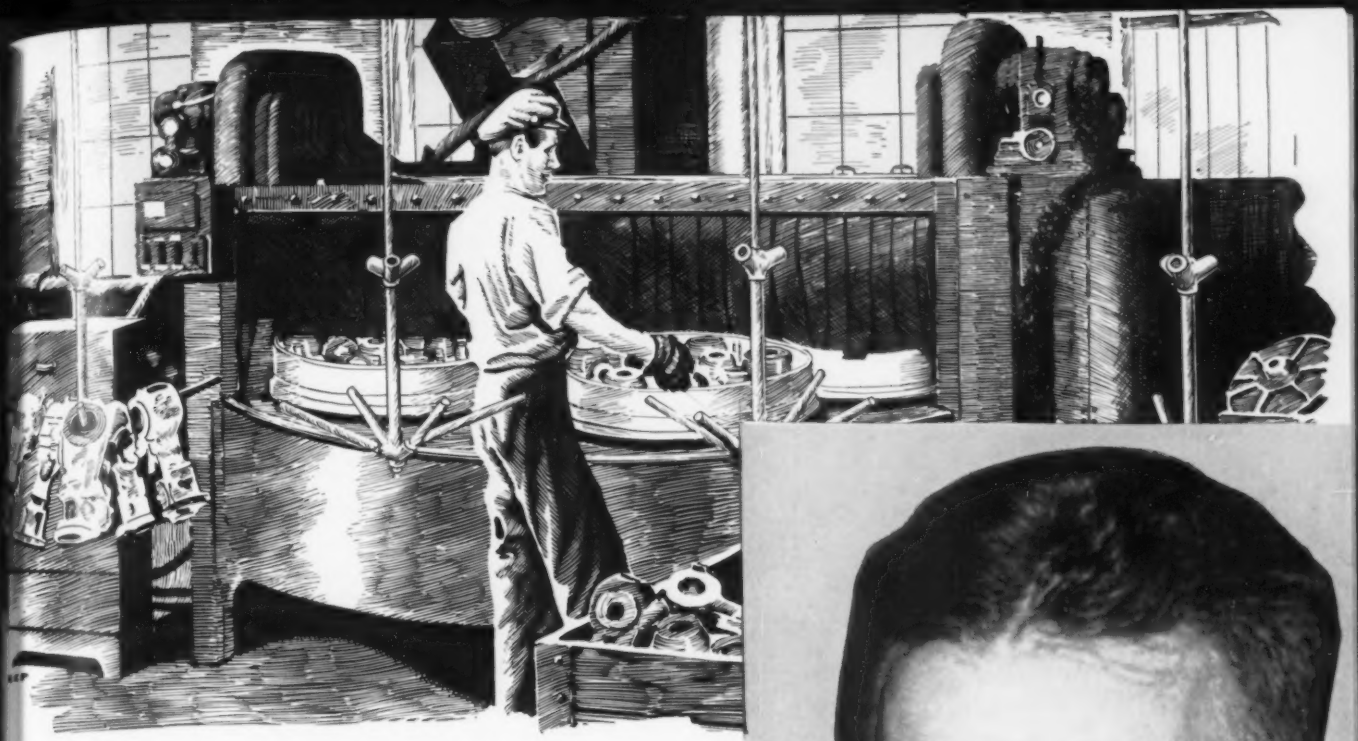

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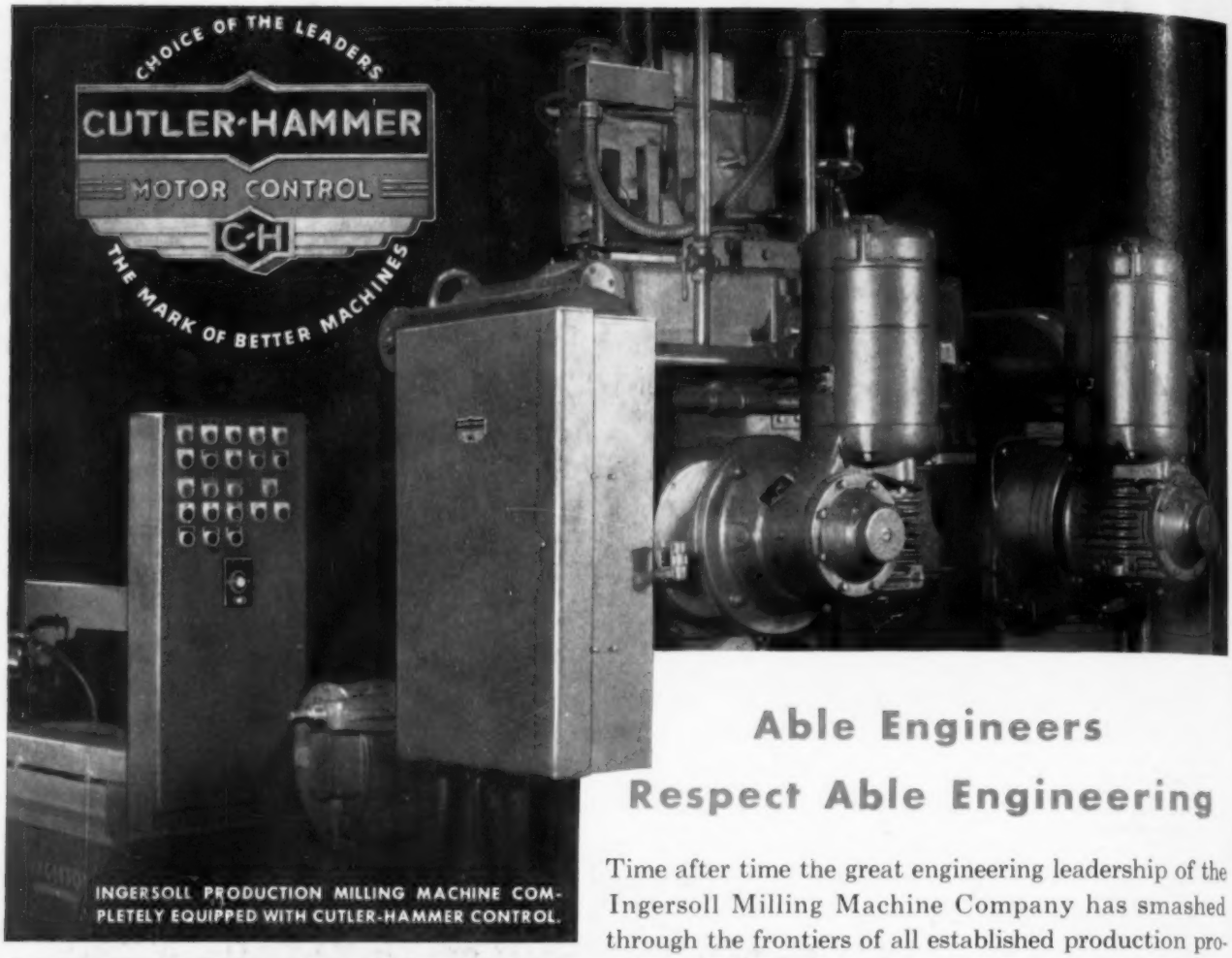

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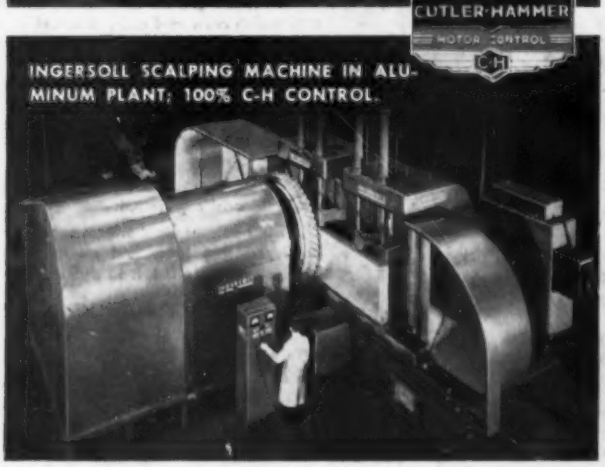

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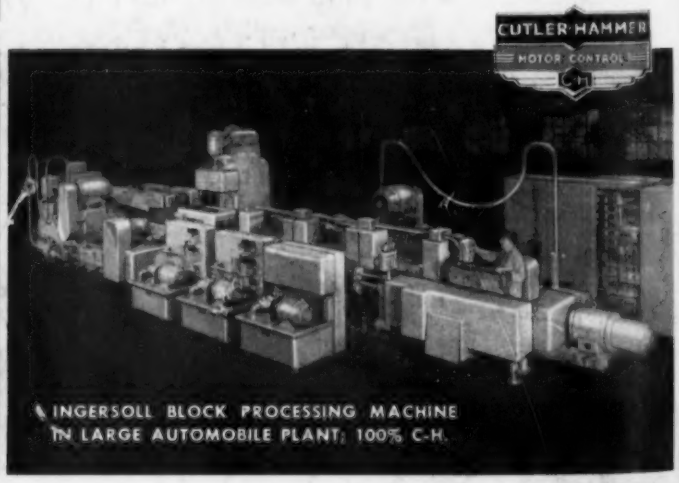

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